CHILDREN'S TELEVISION WORKSHOP • SEPTEMBER 1984 • $1.75

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THE WORLD OF COMPUTERS AND NEW TECHNOLOGY

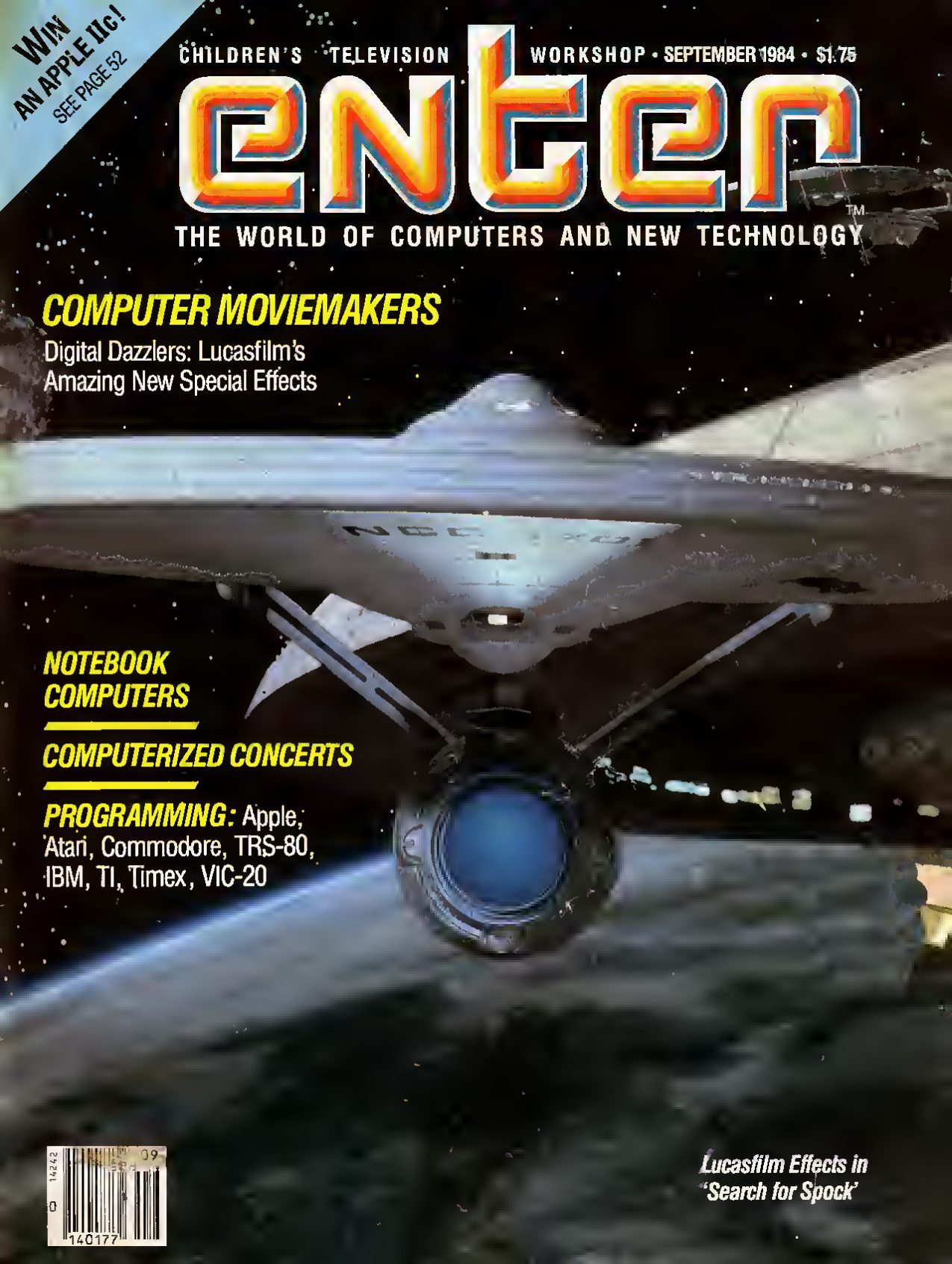
COMPUTER MOVIEMAKERS

Digital Dazzlers: Lucasfilm's Amazing New Special Effects

NOTEBOOK COMPUTERS

COMPUTERIZED CONCERTS

PROGRAMMING: Apple, Atari, Commodore, TRS-80, IBM, TI, Timex, VIC-20



Lucasfilm Effects in "Search for Spock"

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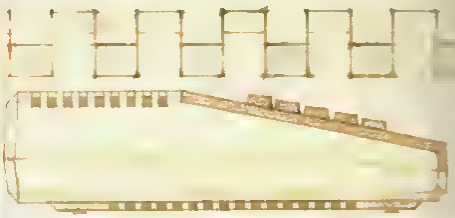
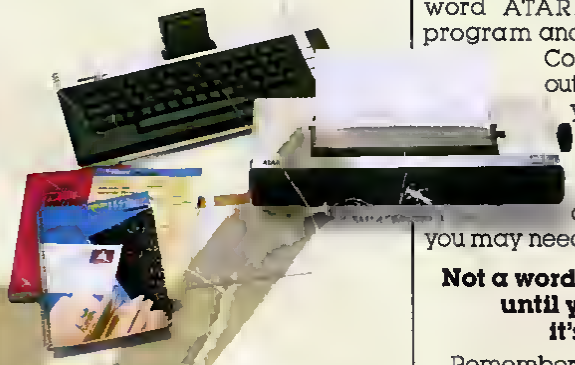
DISCOVER COMPUTERS WITH ATARI.



AtariWriter™ makes it easier to be a better writer.

"You get to spend your energy on ideas rather than typing."

—Alan Alda



The AtariWriter™ program takes the drudgery out of writing by eliminating the drudgery of typing—worrying about typos, whiting out mistakes, retyping new drafts over and over and over.

Spend more time writing, no time retyping.

Whether you're writing a personal letter, a paper for school, a report for your club or magazine articles for a living, AtariWriter lets you compose and edit your text on your TV screen, before you put it on paper. Got a sentence that seems out of order? It's easy to reposition it with AtariWriter. Would the third paragraph make more sense as the fifth paragraph? It's just as easy to move whole paragraphs around. Are you a miserable speller? Add the new 36,000 word ATARI® Proofreader™ program and your ATARI Home Computer will search out spelling errors for you. You can even instruct the Proofreader program to check spelling on technical words you may need in your writing.

Not a word touches paper until you're sure it's right.

Remember, you've been able to make all these changes before a single word has been put on paper. You've been spending your time creating, not wasting it typing draft after draft. But when you finally feel your writing is polished to perfection, the ATARI 1027™ Letter Quality Printer will print out as many crisp, clean copies as you need on plain bond paper or your personal stationery. (It even automatically numbers pages for you!)

What if you suddenly find you need more copies six months from now? No problem at all if you've got either the sophisticated ATARI 1050™ Disk Drive or less expensive 1010™ Program Recorder. These devices let you "store" your text indefinitely, "just in case."

Here's what you need to start writing better.

The AtariWriter word processing program works with any ATARI Home Computer—including the new 600XL™ and 800XL™. You can choose either of two ATARI printers: the high speed ATARI 1025™ 80-column, dot matrix or the ATARI 1027 Letter Quality model. And either of two text storage systems: the ATARI 1050 Disk Drive or ATARI 1010 Program Recorder. No matter what combination you choose you'll be paying less than most other word processing systems.

Stop by your Atari Dealer today and see how much easier it is to be a better writer—now that Atari has made it so much easier to write.

DISCOVER WHAT YOU AND ATARI CAN DO.

MENU

SEPTEMBER 1984

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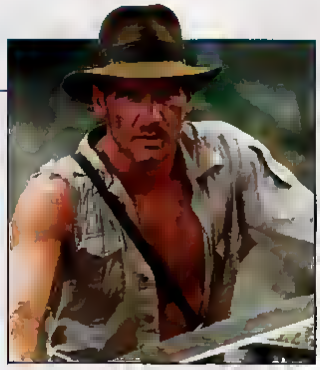
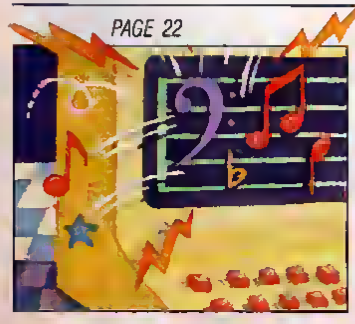
VOLUME 1, NUMBER 10

FEATURES





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DEPARTMENTS

PROGRAMMING

Cover Photo courtesy Industrial Light & Magic © Paramount Pictures Corp.

INSIDE STORY

It felt as if I had entered a gigantic video game. The convention hall was blazing with flashing neon signs and the sounds of aliens being zapped. Robots were going through their paces, electronic instruments were playing, and loudspeakers were blaring.

It was an average day at the 1984 Summer Consumer Electronics Show (CES).

CES is a giant showcase for electronic products. Twice a year, people in the computer business go to these shows to see the newest hardware, software and peripherals. As ENTER's software editor, I immediately began examining the hundreds of packages of new software. Many of them were little more than copies. I saw adventure game knock-offs and construction set rip-offs, clones of *Pac-Man* and copies of *Zaxxon*.

On the other hand, I saw evidence that things are changing. Computer graphics and sound quality are getting better. People, animals and flying saucers now *look like* people, animals and flying saucers. Another pleasant surprise is the improvement in the packaging of software. Many disks now come with extras, like bound-in books, "clues," and keyboard overlays. These extras add to the fun and value of the software. We've come a long way since the early *Pong* days.

I spent a lot of time at CES investigating software, but a crowded convention hall isn't the best place to judge quality. That's why we made sure that the more interesting packages were sent to ENTER reviewers. You'll be reading their opinions in the coming months in "User Views," in our regular feature "round-ups," and in our new review column, "Software Scanner."

Without a doubt, there will be some exciting new software out this year. Also without a doubt, there will be some poorly designed packages. ENTER is working hard to help you decide which ones are worth your time and money.

Susan Janell

Susan Jarrell
Associate Editor

(For details of all the new products shown at CES, see this issue's "NewsBeat ")

ENTER™

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If your parents complain that this is what all computer games are doing to you, they obviously don't know about Spinnaker.

With most computer games the biggest challenge isn't the game. It's keeping your parents from objecting to it.

Now, Spinnaker has the answer. It's called the Learning Adventure Series, and it's a whole bunch of great games that will challenge and inspire your imagination for hours. But won't inspire hours of complaining from your parents.

Of course, even if they didn't offer this nice little benefit, our games would still be fantastic. Because they've got the kind of built-in, long-lasting excitement and adventure that make great games great. You'll explore, figure, and investigate your way through all kinds of situations. You can bargain with aliens, search a haunted house, even build your own railroad empire. And that's a lot more fun than most games that are "bad" for you.

So the next time your parents complain that computer games are turning you into a vegetable, tell them about Spinnaker's Learning Adventure Series.

Then you can get down to the business of fun and games in peace and quiet.

Spinnaker Learning Adventure games are available for Apple ® Atari ® IBM® and Commodore 64™ home computers

It's New! TRAINS.™
You're in charge of an old time railroad—and whether it turns into a bonanza or a bust depends on how well you run it. But either way you'll find that working on this railroad is a challenge—and a lot of fun! **Ages 10-Adult.**

It's New! ADVENTURE CREATOR.™
Design a challenging adventure game that you or a friend can tackle—or let the computer design one for you. It's complex, exciting—utterly addictive! **Ages 12-Adult.**

IN SEARCH OF THE MOST AMAZING THING.™
It isn't easy to find—even in your B-liner. But you'll have help from your Uncle Smoke Bailey as you search the universe to find the Most Amazing Thing **Ages 10-Adult.**

SPINNAKER™
We make learning fun.

Disks for Apple Atari IBM and Commodore 64
Cartridges for Atari and Commodore 64—(ADVENTURE CREATOR only)

FEEDBACK

HOT COPIES: READERS RESPOND

"Hot Copies" is a *very hot* topic. We were astounded by the number and length of your responses to our April article about the "pros" and "cons" of copying computer software.

Among those who wrote us, 62 percent thought that duplicating software was harmless. Most believed such copying was all right *only* if you're going to trade disks with friends, but *not* if you're going to sell the copied software to make money.

About 17 percent thought *any* software copying was wrong and should be punished as a crime.

Unfortunately, we don't have the space to run all your letters. But here's a sampling of your hot comments.

A NEW VIEW

My friends were always talking about copying disks. I thought it was fine. It's not hurting anybody.

As I started to write my own games, I realized that if somebody stole my game, I would be mad. I talked to my friends—they still thought it wasn't hurting anybody. So I said "Give me *your* best program," and they saw my point of view.

—Adam Bartlett
Walden, NY

© STAN FELLERMAN

PIRATES, NOT PUNKS

I was very vexed by your article on computer pirates. I am a computer pirate myself. It was not really your article that got to me, but the picture in the article. You people are trying to stereotype us. We are not a bunch of punks with shades. In the future, I would be pleased if your photos would be more reflective of the excellent writing.

—Doctor X

PIRATES ARE THIEVES

I find it difficult to accept even a discussion of the copying of software. The investment of time and knowledge necessary to produce a program is what is for sale. If you cannot create, then you must purchase.

If you benefit financially by copying (not paying an appropriate price), you have caused financial injury to the programmer. Thus, you have stolen their product. Thus, you are a thief.

—E. Robert Fuhr
Director of Computer Instruction, Middle School,
Accord, N.Y.

Why should we pay the rising prices only because pirates don't want to? What about computer programmers and their families? They depend on the money.

—Jennifer Baker
Wheaton, IL

As software developers, we are annoyed by pirates, but feel that the major cost is passed on to the consumer.

Piracy, like shoplifting, introduces additional costs which, as usual, are passed on to the con-

sumer. Your article asks, "Who is hurt?" The answer is "Everyone."

—Hank Krejci
HFK Software, Inc.
Danbury, NH

I feel that copying software is a crime, but so are the prices software goes for. If the people who write these programs want to make money, they should sell their programs for much less. This is the only way to really cool off computer pirates. —Laura Caldwell
Marquette, MI

DUELLING DISKS

I was quite impressed with the stance taken by Penguin Software, not protecting some of their programs from duplication.

I will not share, give, sell, lend or otherwise make available any software I buy that has not been protected. To companies that protect their programs, however, I feel no mercy. They have challenged me to a duel.

—"Anonymous in California"

PIRACY IS INEVITABLE

I am a pirate and have been for some time. The price of software these days is absolutely outrageous. Even the "Nibble Copiers" are so expensive, one almost has to pirate one to start pirating other disks.

Most computer users I know copy software. It is not hard to see why. As soon as someone buys a computer, the first thing they want to do is buy software. So, they spend another $300 on programs, and think they're set for life. Two weeks later, they find out that there have been five revisions.

"Copying software is a crime... so are software prices."

Sooner or later, they will copy that new program.

I am 13 and own an Apple IIe. The word processor on which this was written was pirated.

—Name Withheld

I just can't resist trying to crack a really tough, copy-protected program. And I think it's this challenge that makes so many people want to "create" illegal copies. It's the thrill of doing something you know you shouldn't. Also, it's the fact that you can get $30 programs for practically nothing.

—The Plaid Phantom

MIXED FEELINGS

I am a high-school sophomore who frequently exchanges software with my friends. We are all for copying software—we do not believe that it is immoral.

However, I myself have had a few programs published for clubs, and it is not a nice thought that people are giving away something that took four months to create. —G.M.
Royal Oak, MI

COPYING FOR A GOOD CAUSE

I have a friend whose mother copied software once for my school. I think if someone makes one copy for a school or business, that's OK. —Graine O'Neil
Leesburg, FL

PIRACY HELPS

If there were no pirating, people would not be able to get large libraries of software, and would be unwilling to fork over $2,000 and up for a computer.

So, indirectly, pirating actually helps software producers and computer manufacturers.

—Monkey Man

I think piracy is OK for a backup copy and for friends (but not the whole state). You can use my name. But, if the company comes to my door, I'm not telling them anything. —Robert Adams
Medford, WI

My friends and I copy software and trade. We don't charge money. The reason we do this is to save money—not to "rip off" the programmer! The bottom line is that we kids can't afford to spend our limited resources on "turkeys."

—Name Withheld

FINED FRIEND

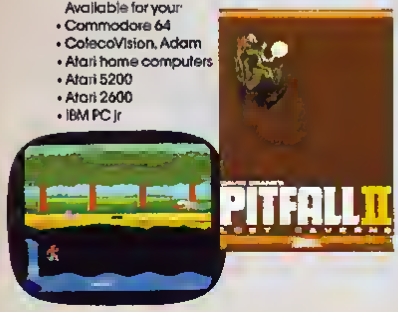
I have a friend who copied off school disks and sold them. I told him not to, but he continued. The school got after him and he had to pay a fine. —Justin Koplin
New York, NY

(Continued on page 61)

WHAT WOULD YOU DO IF YOU

You leave the sun behind as you lower yourself down into the unexplored caverns beneath the Peruvian jungle. Deeper and deeper you go. Past Amazon frogs, condors, and attacking bats. Across eel-infested underground rivers. From cavern to cavern, through level after level. Swimming, running, dodging, stumbling, you search for the gold, the Raj diamond and the thing you really treasure ... adventure. Head for it. Designed by David Crane.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600
- IBM PC jr



As you suit up you see the webbed forcefield surrounding your planet. Holding it. Trapped with no escape. No hope. Except you: The Beamrider. The freedom of millions depends on you. Alone you speed along the grid of beams that strangle your planet. Alone you must destroy it sector by sector. Your skill and your reflexes alone will determine the future of your people. Take their future in your hands. Designed by Dave Rolfe.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600

You made it. The Olympics. You hear languages you've never heard. And the universal roar of the crowd. You will run. Hurl. Vault. Jump. Ten grueling events. One chance. You will push yourself this time. Further than ever. Harder than ever. But then ... so will everyone. The starting gun sounds. A blur of adrenaline. The competition increases, now two can compete on screen at the same time. Let the games begin. Designed by David Crane.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600 (1-4 players alternate)

WERE IN THEIR SHOES?

You've put on your badge, grabbed your nightstick and headed out. But what's going on in that department store? A good old-fashioned chase that's what. You've got to catch the greedy little burglar who keeps throwing beachballs, toy airplanes and shopping carts in your path. Up the escalators. Down the elevators. From floor to floor. There's something funny going on here. Take charge of the investigation, lieutenant. Designed by Garry Kitchen.

Available for your:
- ColecoVision, Adam
- Atari home computers
- Atari 5200
- Atari 2600

You have heard the elder speak of one central source and a maze of unconnected grey paths. As you connect each path to the central source, what was grey becomes the green of life. When all are connected, then you have achieved "Zenji." But beware the flames and sparks of distraction that move along the paths. You must go beyond strategy, speed, logic. Trust your intuition. The ancient puzzle awaits. Designed by Matthew Hubbard.

Available for your:
- Commodore 64
- ColecoVision, Adam
- Atari home computers
- Atari 5200

You prepare for what may be your last take-off. Negotiations have failed. The Dreadnaught moves in. You must attack. No single hit will stop it, you must destroy individual energy vents, individual engines. Approach. Attack. Swerve away. Again and again. An evil enemy inhabits the massive Dreadnaught. And you alone, a small speck in the vastness of space, fly out to meet it. Get on board, your ship is ready to leave, sir. Designed by Tom Loughry.

Available for your:
- Atari home computers
- Atari 5200

ACTIVISION.

We put you in the game.

BITS

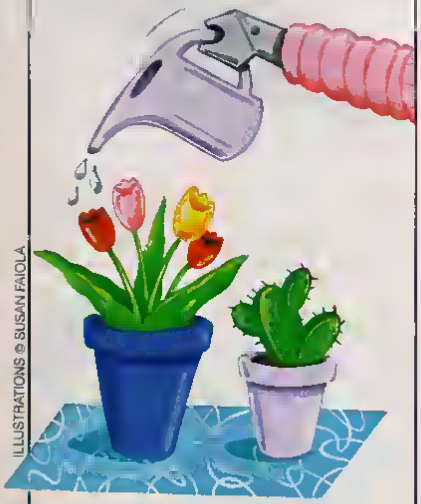
WHEN IT DRIES, IT POURS

Lawn care is now water under the micro with an electronic device that automatically waters the yard, the plants and even the pets.

The RainMatic, with its built-in microcomputer, attaches to a faucet. It turns your sprinkler on and off up to eight times a day. You can even program it to skip certain days.

Thirsty pets and plants will benefit, too. Just leave a hose in your dog or cat's dish or in a planter, and set the timer.

Now if RainMatic could only control the clouds on weekends.....



ILLUSTRATIONS © SUSAN FAIOLA

BEAT IT

Do you listen to hit tunes on a stereo headset when you hit the pavement to go jogging?

There's a better way, says Raul Espinosa of Music in Motion. Raul's Alameda, California, company has come out with cassettes specially synchronized to the rhythms of different sports.

"We lay down a tempo—usually upbeat (but *not* rock), then an instrumental track, then a recreation of a heartbeat," says Raul. It's all carefully engineered to help athletes release "negative body tension" and aim for top-caliber performance.

There are tapes for such activities as running, skiing and cycling. If they have one you can listen to at lunch, we'd be glad to eat to the beat.

PAC-VAN FEVER

What's yellow on the outside, has four wheels, and is filled with wall-to-wall games?

No, it's not a rolling video banana. It's Pac-Van, a game-filled party van which rolls around the Washington DC area. Pac-Van owner Bette DeYoung Forman rents her drive-in arcade for pool parties, birthday parties, and other festivities at $70–$130 an hour. The van holds 25–30 games including *Galaga*, *Centipede*, *Turbo*, *Stargate*, *Gorf*, *Donkey Kong Junior*, *Blue Print*, *Qix*, and two *Ms. Pac-Mans*.

Who are Pac-Van fans? "I've had everyone from seven-year-olds to grandparents using the van, including a couple of senators and congressmen," says Bette, who seems to have hit on a capitol idea!

BOWL-ING FOR SCHOLARS

Neither Caltech nor MIT is known for its championship football teams—but that didn't stop either high-tech university from making it to the scoreboard of the 1984 Rose Bowl in Pasadena, California.

Caltech seniors Ted Williams, a physics major, and Dan Kegel, an electrical engineering major, devised an electronic system that let them change the scoreboard as 80,000 fans watched. They replaced the names of the actual Rose Bowl teams—UCLA and Illinois—with Caltech and MIT. Williams and Kegel's substituted score was Caltech 38, MIT 9.

To make the change, the two pranksters secretly installed a microprocessor into the electronic system controlling the scoreboard. A radio link-up connected that micro with a computer and keyboard. Williams

and Kegel were on a hill two miles away working the keyboard.

The final score: Kegel earned class credit for the trick, but may face criminal charges for trespassing. The Los Angeles police, it seems, were *not* amused.

LUAU LINK-UP

Hawaii was the last state to join the Union. But it may soon become the first state-of-the-art computer-commuting state.

The transportation department and the Honolulu Area Rapid Transit System are considering a plan to install 300,000 computer terminals in homes and public areas. The purpose: to give commuters quick access to videotext data on traffic conditions, car pool and taxi availability, and public transit schedules. This system, it is hoped, will ease traffic congestion, especially at rush hours.

The plan will cost $200 million. Eighty percent of the cost would be paid by Hawaii's 800,000 residents and 20 percent by the state or federal government. That's still $700 million less than the alternate plan—to build a whole new rapid transit system.

COMPUTER COOK-UP

It's not easy to cook up a storm when all you've got in the fridge is leftover meat loaf, two eggs, a lamb chop, creamed spinach and half a peanut butter and jelly sandwich. But now, thanks to Softsmith's *Micro Cookbook*, you may be able to turn such items into a brilliant culinary creation.

Micro Cookbook does more than store recipes. First, you type in ingredients. Then, within moments, *Micro Cookbook* prints out a list of recipes that use those foods. And if you need to turn a recipe for two into a recipe that will feed 20, the computer will do the calculations.

Sounds delicious. But frankly, we're not sure we want to know how to combine leftover meatloaf and half a peanut butter and jelly sandwich.

PLAQUE-MAN FEVER

Look! Up on the screen! It's a toothbrush! It's a cursor! No—it's...it's ...*Plaqueman*!

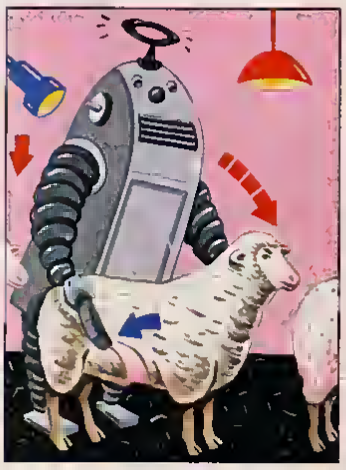
Plaqueman, a new computer game from Home Computer Software, flies across the screen cleaning teeth and fighting that arch villain—Tooth Decay.

If Plaqueman wins, there are bright smiles everywhere. If Plaqueman loses, the results are ruthless—or perhaps we should say toothless.

A SHEEPISH ROBOT

Where there's wool, there's a way—and the Australians have come up with a high-tech way to get the wool off sheep.

Researchers at the University of Western Australia have built a robot that can make short work of sheep shearing. The robot's computer memory contains a generalized map of what the average sheep looks like. The robot uses this as a guide when giving sheep their regular clipping. The current robot has successfully shorn hundreds of sheep. But it may soon be replaced by a more efficient model that can get 25 percent more wool off each sheep.



What will happen to the old sheepshearing robot? It'll probably be put out to pasture. Baaaahh!

ASK ENTER

BY DAVID B. POWELL

WHAT'S 'COMPATIBILITY'?

DEAR ENTER: What does it mean when companies say their computers are compatible with other computers, like the IBM PC? —Joel and Laura Crosby, Jamaica Plains, MA

DEAR JOEL AND LAURA: When people say one computer is "compatible" with another, they mean that both computers will run the same software (disks, programs, etc.) However, it's not quite as simple as that. There are different degrees of "compatibility."

Some computer companies design their machines' circuits so they are almost identical to another computer. A good example is the Franklin Ace, which is almost an exact copy of the Apple IIe. The Franklin is so compatible with the Apple, it will run Apple software without a hitch. (In fact, Apple recently went to court to force the Franklin people to change the design of their machine slightly.)

But even if a computer doesn't have the same circuits, it can be designed to run the same software as another computer. The IBM PC has a lot of compatibles of this type, sometimes called "emulators." Two examples are the Compaq and the Eagle.

Sometimes, companies use the word "compatible" to mean their computer uses the same operating system as another machine. But just because two computers have the same operating system, it doesn't mean a disk that runs on one will run on the other. For example, a number of computers run versions of the CP/M operating system, but you usually can't trade disks between them.

As you can see, there are several ways the word compatible is used by the computer industry. So, when someone says a computer is "compatible," you should always ask, "*How* compatible is it?"

Eagle computer: An IBM "emulator."

INFO FLOW

DEAR ENTER: How does information get from a disk drive to a computer's memory? —Tom Barton, Gladstone, MO

DEAR TOM: You can get an idea of how this works by comparing your computer to a record player. A phonograph record contains coded information in its grooves. That information is "read" by the player's needle. The bumps and valleys in the record's grooves are translated into an electric current. Then that current is sent through the amplifier to your speakers.

A floppy disk is similar to a record. It, too, has coded information, in the form of magnetized spots on its surface. These spots are arranged in circular tracks, which are read by a magnetic sensor. The information (the *bits*) found by the "head" are translated into an electric current. But instead of going to an amplifier, the information is sent to a "disk controller"—a chip that formats the data. This chip then sends the data to the computer's memory.

DO GAMES HURT YOUR T.V.?

DEAR ENTER: Will playing games or running computer programs for long periods of time ruin my television set? —Chiffonya Brown, New York

DEAR CHIFFONYA: No, it won't. But this problem used to occur when video game cartridges were a new technology. If you forgot to turn off the game and left it running a long time, you might come back and find "shadows" of game characters on your TV. These shadows were burned into the screen because the same game picture had been on for so long.

When the problem was discovered, game makers changed the way the game's programs work. Now, all cartridge game programs will shift their colors whenever the computer chip inside senses a program is not in use, or after a game has ended.

If you have a question about computers, write: Ask ENTER, ENTER Magazine, CTW, 1 Lincoln Pl., NY, NY 10023

RANDOM ACCESS

WHY PROGRAMMING BUGS ME

© ANTHONY SUAU PICTURE GROUP

What's the point of programming if I really don't know how to *use* a computer?

BY STEPHANIE KAUFMAN, 17

Do you know how to program? I do. I know Applesoft BASIC, Integer BASIC, Fortran, UCSD Pascal, Mt. + Pascal and Forth. I've taken five semesters of Computer Math and spent many hours working in my school's computer lab.

There's one thing I don't know, though: how to use computers in a practical way.

I don't know how to work a word processing program. I have no experience making graphics or planning a budget on a computer. And when it comes to gaining access to a service like The Source, I'm lost.

I think there's something wrong with the way computers are being taught in schools.

I go to George Washington High School in Denver, a school that is nationally recognized for its progress in teaching computer skills. I first learned to program about three years ago in a computer math class. I've taken a computer class every semester since then. I've worked on many machines and written programs in various languages.

Recently, my parents brought home a program that's supposed to help them plan their budget on our Apple IIe. They figured that with my background in computers, I'd be able to explain how to use the program. I hadn't the slightest idea how it worked.

At school, we're always hearing about the importance of learning to use computers. The funny thing is, we never learn any of the practical applications. Instead we learn to program, a skill we may never need outside of class.

A lot of students aren't that interested in programming, and may end up not learning about computers at all. That's a shame. Not everyone needs to know BASIC and Pascal, but almost everyone would benefit by knowing how to use computers.

One way of teaching us how to use computers without focusing on programming is by using computers in our other classes. For instance, why not encourage students to use the word processing software for writing a term paper for English class? Or why not have students research a court case for a history class via The Source? These students would see—in a *personal* way—how useful computers can be. And then, if they wanted to learn how computers work, they could take a programming class.

Think of it this way: I know how to drive, but I have no idea how a car works. I know how to take care of a car, keep it safe and clean, and how to fill it with gasoline. But I don't know what makes it run, nor do I need to. I *do* need to know how to drive one. Well, it's the same with computers. We don't need to become "computer mechanics," but we do need to know how to "drive" computers.

Somebody tell the schools.

STEPHANIE KAUFMAN is editor of her school's newspaper.

Have a computer experience you would like to write about, or an opinion to share? Send a short note to: Random Access, ENTER, 1 Lincoln Pl., New York, N.Y. 10023.

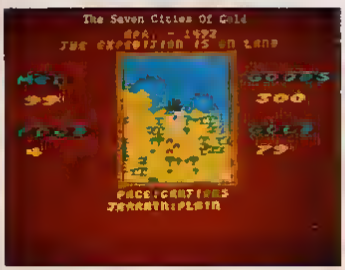
USER VIEWS

NEW COMPUTER GAMES

BY PHIL WISWELL AND BERNIE DEKOVEN

THE SEVEN CITIES OF GOLD

(Electronic Arts, disk for Apple II, $40, also for Commodore 64 and Atari computers)



The Seven Cities of Gold is a graphic adventure game, and one of the richest, most exciting computer experiences we've ever had. It lets you discover and explore the geography, natives and resources of North and South America through more than 400 years and 2,800 screens.

The quest begins in Spain. You are given an initial supply of money to buy ships and outfit them with men, food, and trading goods. After loading the game disk, you replace it with a blank disk (sort of like a blank map). As you discover new territory, the computer updates your map. To transfer this information permanently into your records, the expedition must return safely to Spain. Otherwise, anything gained on the trip—gold and maps—is lost forever.

The terrain you cover is displayed in a window you can move over the game screen. The expedition party is always in the center of this screen.

Exploration of various terrains—mountains, plains, swamps, forests, rivers, lakes—is only half your task. You're also supposed to find and convert natives, establish missions and forts, and return to Spain laden with gold. Life will go much better for you in the New World if you make friends. Friendly natives will help you locate villages and gold mines, while word of your attacks will spread quickly to neighboring villages. The way you play determines the way you are treated.

WRAP-UP

BERNIE: The joystick works exceptionally well to control every aspect of this game. I thought documentation could have been better. But each journey across the ocean lasts just the right amount of time before you start to panic.

PHIL: Historically, one should play only from 1492-1540, which is the end of the age of exploration. Each of our games has lasted at least 30 hours of real time. But we discovered that the game clock will run all the way to 1900, which gives even the worst adventurer plenty of time to see everything.

PITFALL II: LOST CAVERNS

(Activision, VCS cartridge, $34.95, also for ColecoVision/Adam, Atari 5200, Atari computers, Commodore 64 and IBM PCjr)

This game picks up where *Pitfall* left off. This time your character—Pitfall Harry—moves through a search for gold and other treasures. There's more variety of action in this sequel than in the original. Even if you have *Pitfall*, you could get this game and feel challenged—*Pitfall II* is different from its famous namesake.

Pitfall II begins with several above-ground scenes, then goes deep underground. There are walkways, ladders, pits and dead ends containing the treasures you seek—and all are protected by bats, frogs, condors, scorpions, and electric eels.

There's a nice extra here, too. Every so often you'll find little red crosses as you move along. When you're stung by a creature, you are sent back to the last cross you touched, rather than to the beginning of the game.

WRAP-UP

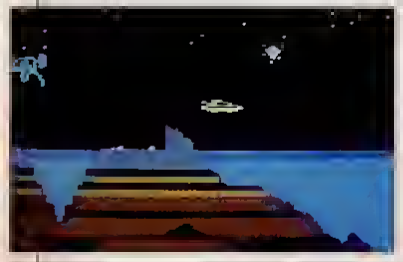
PHIL: I was able to beat this game much faster than the original *Pitfall*—not because it is any easier, but because the structure favors the player There is no time limit and no limit to the number of enemy stings one can sustain In fact, there are only two ways to end the game by finding all the treasures, or by turning off your VCS!

BERNIE: This is a very enjoyable action game, though I feel you'll get tired of it pretty fast

JAMES BOND: 007

(Parker Brothers, cartridge for Atari computers, approximately $40, also for Commodore 64, ColecoVision, and VCS)

There are four sequences to this game, based loosely on the themes of the movies *Diamonds*



Are Forever, The Spy Who Loved Me, Moonraker, and *For Your Eyes Only* Each is an action game in which Bond pilots a special land/sea/air craft through treacherous terrain and enemy bombs The idea might have worked if the graphics were not so blocky and if the gameplay was not so repetitive and boring

The only things you do are dodge and shoot and try to land on specific targets that aren't very realistic You don't feel much like Bond

WRAP-UP

BERNIE: I found the ColecoVision version best, but that's not saying much

PHIL: My best advice is to save your money for the next James Bond film festival

GUMBALL

(Brøderbund, Apple and Atari, $29 95)

Gumball requires more mental than physical dexterity This is not a hard action game It's more like juggling

The game screen represents a gumball production line with connecting tunnels that eventually dump gumballs on the bottom of the screen You control the sideways movement of a pair of carts—one for green gumballs, one for blue The object is to catch the gumballs with the appropriate cart by positioning the carts beneath the chutes

When you first see the screen, the game looks easy But sorting the gumballs into the proper carts within the time limit *isn't* easy The game requires you to think hard and to constantly redefine your strategy

If you catch the wrong color gumball in a cart, a little production manager comes out to spill the contents of that car This means you'll have to work that much harder and faster to meet your quota It gets to the point where your head hurts trying to plan everything

WRAP-UP

PHIL: I thought it was great that after each successful level, a cartoon shows your little character receiving a promotion and a new, and bigger, house! You really feel you've earned those rewards!

BERNIE: I didn't like those incentives—I found them insulting Still, the game always kept me on my toes

BUMP 'N' JUMP

(Mattel, Intellivision, VCS, $30)

Bump 'N' Jump is perhaps the best translation of an arcade game ever done for Intellivision And now that Mattel has announced the sale of its

electronics division, this will probably be the last great video game from that company

The game is a cross between a high-speed race and a demolition derby The object is to gain points by racking miles and wrecking cars

By bumping into the other cars at the proper speed and angle, you send them smashing into obstacles or the guard rail for

(Continued on page 60)

SOFTWARE SCANNER

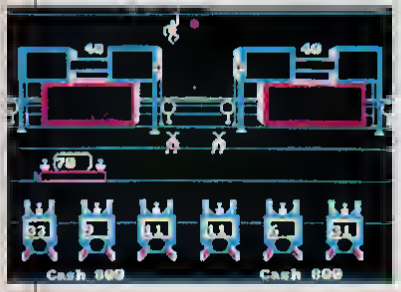
BY HILDE WEISERT

Home computers aren't just playing games anymore. Software programs now help you create graphics and music, study languages and science, sharpen your typing skills and process your words. Which software packages are worth the investment they require? "Software Scanner" will tell you. Who is the software intended for? Is it enjoyable? How easy is it to use? Our reviewer, educational consultant Hilde Weisert, will scan the field. Then each month we'll print out her opinions of the good, the bad, and the bug-ly.

RUN FOR THE MONEY

(Scarborough, IBM PC, $49.95)

The two-player *Run For The Money* drops you into sky-high finance on the Planet Simian. Your



spaceship has crashed there, and to leave the planet you have to fix your cracked paint shield. To fix the shield, you have to buy paint. To buy paint, you have to sell synannas. To sell synannas

You get the picture. The picture, be advised, is so busy that you'll need all your arcade skills to keep up. (Hit "Pause" --*P*-- to catch your breath.) But the skills that really count are business strategies—like *Fast Lane* and *Pot Roast*. (Don't laugh; this is real economics, and it's explained in the manual.) You can pre-test tactics on the nifty "What-If Prediction Machine," a mini-spreadsheet.

There are a couple of weak points. *Run for the Money*'s on-screen tutorial is quite useful, but you have to wait till the end of the disk to use it. And I question the publisher's recommended "10 and up" age range—unless you're a competitive 10-year-old wheeler dealer.

Competition is the name of this game. No, I know—the name is really *Run For The Money*. And it'll teach you a lot more about economics than *Monopoly*™ did. In its own high-tech way, it's as enjoyable

PERIPHERAL VISION

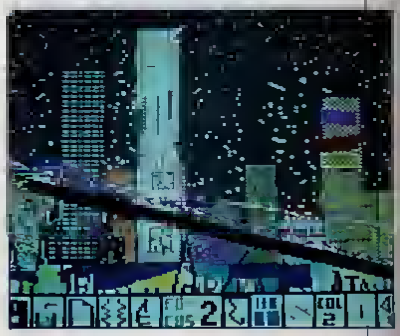
(Futurehouse; Commodore 64, Atari, IBM; $59.95 w/light pen; $39.95 without)

A light pen is a cousin of a touchpad, except you work right on the screen with the pen. With this software and the Edumate light pen, you can do some nifty things.

For example: you can draw with six varieties of fat or skinny strokes, outline and color shapes, shade backgrounds and zoom in for details at 8X magnification, and much more. I like the way your drawing pad is framed, top and bottom, by color and command menus. It means you don't have to flip to another screen to see your options.

Peripheral Vision lets you save and print your work. Written in "binary files," your screens can shine in other BASIC programs.

Using this pen requires two hands. The two-handed operation (one hand on the keyboard) is clumsier than a ballpoint-type clicker would have been. And



when you're formatting a disk, it's too easy to erase the program.

But with features that rival many high-priced graphics packages, the *Peripheral Vision* set is a very reasonable investment.

FLIGHT SIMULATOR II

(Sublogic; Commodore 64, Apple, Atari, disk and cassette; optional joysticks; $49.95)

If you've always dreamed of being the pilot of a snappy little single-engine aircraft, dream no more. Shaded color graphics, full flight controls, nice landscape,

and professional charts make *Flight Simulator II* so realistic that you'll be checking your seat belt at take-off

The top half of the screen is your 3-D cockpit window An instrument panel fills the screen's bottom half You check the dials: airspeed, altitude, heading Pull back on the throttle/joystick and you're soaring over blue Lake Michigan Suddenly the water rushes up—"Splash!" (If the sound is on, you'll hear it.) After lots of disk drive whirring (it's slow), you're back on the runway, safe and dry

Almost all of *Flight Simulator II*'s numerous conditions are adjustable. There's a start-out mode for first-timers, and you can save up to 15 death-defying combinations of your own.

If you imagine yourself as the Red Baron, you can play "World War I Ace." For serious flight training, you can practice the flight and aerobatic lessons. Along with hammerhead turns and rolls, you'll be learning about the physics of flight

There's months and maybe years worth of exciting and instructive flying time in *Flight Simulator II*. But be prepared to wade through two textbook-y manuals to take full advantage of this program's impressive possibilities

M-SS-NG L-NKS

(HesWare; Commodore 64, Atari, disk; $29.95)

"Harold, turn that computer off right now!"

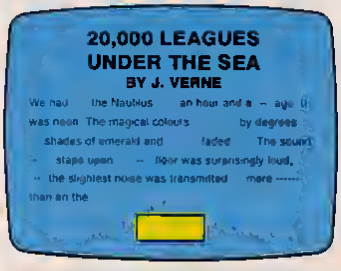
"In a minute—just let me finish writing this scene from Macbeth."

Harold's playing *M-ss-ng L-nks*, a fill-in-the-blanks puzzle where you use word patterns and context clues to complete paragraphs from literature You select a subject area from nine choices (such as humor, mysteries, and unreal worlds). Next, you choose a passage from a list including (wow!) Shakespeare, *Moby Dick*, *The Hobbit*, *The Autobiography of Malcolm X*, and James Bond.

You set the difficulty level, from easy (only the v-w-ls are blank) to brain-crushing (all you get is the -----s!) You can set the length of each side's turn, and the speed with which the program fills in missed letters. Settings can be saved from game to game.

Each player's letters are displayed in a different color, and at the end of a passage you'll see a summary of wrong guesses, correct first-tries, and overall scores

M-ss-ng L-nks does miss the boat in one important way You



can't make up your own puzzles. And you can never print or save the filled-in passages.

Overall, however *M-ss-ng L-nks* is l-ts of f-n, and g--d for you, too

COCO-NOTES

(CBS Software, Atari, disk or cassette, $24.95; Commodore 64, disk $39.95; cartridge, $34.95)

"Hey man, let's go fish for tunes."

This is music? This is fun? *Definitely.* It's the Jazz Scats in *Coco-Notes*, a very hip music game

You're on a tropical island holding a fishing line along with some way-out characters known as

the "Jazz Scats." But instead of fish, the water's full of Coco-Notes And instead of fishing, you're composing songs

Catch notes with your fishing hook/joystick and pop them into the palm tree melody line (6 to 20 notes long, with a range of about 1½ octaves) Then watch the Scats rock—playing your tune.

The Jazz Scats make even the weirdest melodies sound (almost) good. Plus, you don't need to read the manual to play the game A finger-snapping instruction record featuring the singing Jazz Scat crew is included with the software.

Coco-Notes is not for you if you're a serious musician. For the rest of us music fans, it's a jazzy lure into songwriting.

NEWS BEAT

BY RICHARD CHEVAT & SUSAN JARRELL

NEW COMMODORE COMPUTERS

The new Commodore 16 features improved BASIC and 16K RAM.

Commodore's two new computers made the biggest waves at the annual high-tech get-together in Chicago—the Summer Consumer Electronic Show (CES). The new computers—the Commodore 16 and the Plus 4—were among dozens of new pieces of computer hardware and software introduced at the show.

The Commodore 16 is designed for beginning computer users and comes with—you guessed it—16K of RAM. In looks and features, the 16 is very similar to the VIC 20, Commodore's current low-price machine. Commodore says that the 16, which will sell for about $100, will run a large percentage of C-64 software. It will also use most existing Commodore peripherals.

Commodore's Plus 4 is a more advanced computer. It features built-in spreadsheet, word processing and data base software. You will be able to play games on the Plus 4, but it really is designed as a low-cost home business computer. It should retail for around $250.

Both of the new Commodores have a much improved version of BASIC, which will make programming sound and graphics much easier. However, neither the 16 nor the Plus 4 has sprites, or the great sound chip found in the C-64. But Commodore says they will continue making both the VIC 20 and the 64, so you will have a choice.

A COLORFUL PRINTER: Okidata, well-known as the makers of computer printers, introduced their first low-cost printer at CES. The Okimate 10 is designed especially for use with Atari and Commodore computers, and will sell for around $240. (Interfaces for other home computers are currently being planned.)

The Okimate 10 is a dot-matrix thermal printer. But unlike most thermal printers, it can produce high-quality color graphics on any kind of paper. You will be able to plug the Okimate printer right into your computer, using an interface. The printer also features software that will enable you to print out whatever happens to be on your screen.

ROBOT ROUND-UP: Robots were rolling around at the Chicago show. Some were on screen, as in The Learning Company's *Robot Odyssey I*. This software for Apple II series computers lets you design and control your own mechanical sidekicks.

And some robots were rolling along the floor. Tomy introduced *Omni-bot*, *Ver-bot* and *Ding-bot*, three remote-control toy robots. Heath/Zenith rolled out *HERO Jr.*, a more user-friendly version of their *HERO 1*. *HERO Jr.* explores, plays games, guards the house and even speaks in his native language "Roblish," a robot version of English.

SOFTWARE SPECIALS: Software at CES was hopping, too. Or maybe we should say "dancing."

Now you can breakdance in the privacy of your home. Epyx's new *Breakdance* game lets you dance through an on-coming gang of breakers, matching moves and recording your own dance numbers. *Breakdance* will be available for C-64, Atari, IBM and Apple computers.

If you don't want to dance, you

can always hit the books. Spinnaker is bringing out two new adventure game series. *Windham Classics* is made up of hi-res adventures based on such classic books as *Swiss Family Robinson* and *Gulliver's Travels*. (Available for Apple, Commodore, Atari and IBM computers.) The other new series, *Trillium*, puts you in the hero's seat in adventures based on works by science fiction writers Ray Bradbury, Michael Crichton, Robert Heinlein, and others. Titles include *Fahrenheit 451*, *Rendezvous with Rama*, *Amazon*, and *Shadowkeep*. (Available for Commodore 64 and Apple II machines.)

Imagic, once known for arcade-style games like *Demon Attack*, has also hit the high road to adventure. The company has introduced book-based hi-res adventures like *Sherlock Holmes*, *The Time Machine* and *Damianos* (For IBM, Apple, Commodore and Atari computers.)

***Breakdance:* A new twist from Epyx.**

If adventure has another name, it could be *Archon II—Battle of the Mages*. This Electronic Arts entry, a sequel to the very successful E.A. game, *Archon*, is a strategy/action game that pits the Fortress of Order against the Temple of Chaos (for Atari and Commodore computers).

SCIENCE IS GOLDEN: For its "Adventures in Science Series," CBS Software introduced two new titles. *T-Rex* and *The Honey Factory*. Another CBS Software entry was *Adventure Master*, a two-disk program that helps you create your own games. (Apple, IBM, Commodore and Atari computers)

HESware also has a science series. In *Space Station*, you supervise the building of an orbiting space station. If you tire of building space stations, you can defend the body by fighting dreaded diseases in *Cell Defense*, or create an on-screen laser show in *Reflections*. (Apple computers)

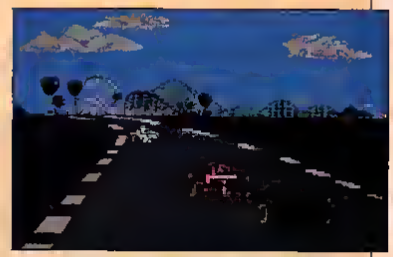
Activision gave a sneak preview of two new software packages, tentatively titled *Explorer* and *The Incredible Activision Pencil*. The *Pencil* software is an on-screen pencil that lets you create shapes and pictures. *Explorer* is a scrolling game where you chart new territory across a 3-D style terrain.

Coleco introduced a hefty bundle of software for the Adam, including *Electronic Flashcard Maker*, *Star Trek* and *The Dukes of Hazzard*. The Adam *SmartLogo* package is designed to be used by every level of Logo enthusiast.

ATARI LAUNCHES 7800 PROSYSTEM: Atari also made a splash at CES with their new video game player, the 7800 ProSystem. The company hopes to spark a new outbreak of video game fever by giving you games with graphics close to arcade quality.

The 7800 can display and control up to 100 on-screen objects at once. Its color and animation are far superior to any seen on previous home video game systems. It comes with the game *Pole Position II* built in, and is expandable to a 4K home computer.

The 7800 will play all 2600 cartridges (with 2600-quality graphics). The system will sell for about $150. Several games are already available for it.



Atari's 7800: Arcade-like graphics.

STATE OF MIND: Atari also played mind games at the show, introducing a new kind of game controller—the *MindLink System*. *MindLink* is a special headband that allows you to sit up to 20 feet away from a game machine and control on-screen action.

MindLink works by detecting slight electrical impulses generated by the muscles in your forehead. Infrared sensors in the band send these impulses to the game machine. The *MindLink System*, which will cost under $100, will be available this fall for the 2600 and new 7800.

HALCYON LASER DISCS SPEAK: The people who helped create *Dragon's Lair* came up with one of the most innovative products at the show. The new system, called *Halcyon*, lets you control laser disc adventures with your voice.

Halcyon, made by RDI Video Systems, already has a half-dozen games available—including a live-action horror adventure. But this voice-controlled laser disc doesn't come cheap. The complete set-up costs $2,000.

SHOW BEAT

EDITED BY PATRICIA BERRY

'CLOAK & DAGGER': SPY GAMES

Doubting Thomas: Can a kid convince his dad this spy game's for real?

The story originally was your basic "boy-who-cried-wolf" tale. An 11-year-old gets tangled in espionage and risks his life, while grown-ups around him smirk at his pleas.

Now, thanks to its 12-year-old star, the movie has computer game twists and heroes who dwell in Ataris. The film is ***Cloak and Dagger***, and **Henry Thomas** is its star and game-addict-in-residence.

Two summers ago, Henry was Elliot, the extraterrestrial's best friend, in ***E.T.*** In *Cloak and Dagger (C&D)*, Henry plays 11-year-old Davey Osborne. Davey discovers that top-secret weapon plans are hidden on a microchip inside a video game cartridge. Spies discover this, too, and are after Davey and the chip. He begs for help, but nobody listens. Davey has long since ruined his credibility with constant spy-game chatter.

The real Henry Thomas has the same history of adventure game talk. In fact, his love, nay, obsession with games like *Dungeons and Dragons* is the root of the *C&D* script.

Before settling on a plot for his film, director Richard Franklin spoke with Henry's mom. "Henry gets so involved in these games, sometimes I don't know when he's telling the truth and when he's talking about some game he's playing," Mrs. Thomas told the director."

That was it! Franklin's movie had found its premise. A boy wound up in adventure games could be spun into a *real* intrigue, and no one would believe him. From plot-prompter to star of the screen, Henry the game-player was a natural resource for the film.

Another resource had to come straight from Atari. Director Franklin needed game designer Russell Dawes to film a critical scene. (Dawes designed Atari's game version of *Cloak and Dagger*, which plays a part in the movie.)

In the script, only a computer game whiz can reach a score high enough to reveal the secret microchip plans. During the shooting of *C&D*, it took Dawes nearly half an hour—and several tries—to conquer his own game.

After that scene, it's up to Davey. He's got to keep the vital cartridge out of enemy hands. But *who* is the real Davey Osborne? Only the screenwriter knew—until now. The film's writer named him after ... what else? The Osborne computer he used to write *Cloak and Dagger*. —*Stacy S. Cochran*

SOAP SOLUTION: When you're a popular soap opera star, what's the best way to field fan mail? Candice Earley, who plays Donna Beck Tyler Cortlandt (love those multiple marriages in soaps) on ***All My Children***, finds an Apple a day is the best solution. Earley uses her Apple IIe to send "personalized" letters and a glossy photo to all her admirers. And when she's on the road performing live, she programs the computer to send invitations to the fans who live in the areas where she's appearing in her stage show.

MOVIE BIT: Voyage of the Rock Aliens is not exactly Steven *(E.T.)* Spielberg gone MTV, but this spoof on beach blanket films of

Rock Aliens: Beach blanket spoof.

the 60's *does* take place in *Speelburgh*, U.S.A. There *is* an encounter with aliens (who find identities on the planet earth as rock stars), and an earth versus outer-space clash *does* occur—but in the form of a battle of the bands. There's also a happy ending to this Inter Planetary Productions release: a smog-free planet earth.

COMPUTER COMICS: The year is 2027, and there's a new group of crimefighters making noise on Earth. There's Dart, a human female warrior and martial arts expert; Christopher Champion, who has the power to "phase" from one dimension to another; the thieving Markian, Pakrat; and Morphea, the mothering scientist from the planet Canopia.

Chief of this cast of human and alien life forms is Martin Champion, powerful commander of the A.T.A.R.I. (Advanced Technology and Research Institute) Force. You'll meet all these characters in ***ATARI FORCE***, a monthly adventure from DC Comics that debuted last January. For subscription information, write: DC Comics Subscriptions, P.O. Box 1308-F, Dept. EN, Fort Lee, NJ 07024.

SUPERMAN WOULDN'T RECOGNIZE IT: Take a black-and-white silent science fiction oldie, add color tinting, never-before-released scenes, and electronic music. What've you got? The **Giorgio Moroder** update of 1926 German film, ***Metropolis***, that's what. The film, about a world of robots and futuristic catastrophes, is considered a classic, so this "remake" may have movie buffs in a tizzy. Nevertheless, MTV fans are getting a sneak preview with the ***Queen*** video "Radio Gaga," in which snippets of the update are slipped in among the more current scenes. Along with Moroder's electronic melodies, songs by **Pat Benatar, Billy Squier, Bonnie Tyler** and ***Queen's*** **Freddie Mercury** give the *Metropolis* soundtrack a very modern meaning.

COMPU-CARTOONS: You know high-tech is everywhere when it invades Saturday morning cartoons. ABC-TV's Saturday morning fall line-up includes arcade games, robots, music videos and computers. For robot buffs, there's ***Broots*** (play with those letters and you get you-know-whats), about five crime-fighting robots and their teenage programmer Rob. Or rev up with ***Turbo Teen,*** a comedy/mystery with 3-D special effects about a kid who turns into a racing car when the heat is on. You're more interested in video games? Then try the cartoon that needs no explanation, ***Dragon's Lair***. How about an adventure with a group of kids who run an MTV-type station? Yep. ***Wolfman's KMT (Kid's Music Television)***, featuring an animated veejay Wolfman Jack, will keep music video fans happy—with two to four real videos each week. If all this makes you hungry for reel information, take the briefest of weekend classes, ***The One Minute Computer Course***.

PHOTO COURTESY OF ABC TV

PACESETTERS

EDITED BY ELIZABETH HETTICH

ERIC'S 'ONE ON ONE' SCORES

© SCOTT DINE/PICTURE GROUP

On the basketball court or on the computer, Eric Hammond is an all-pro.

The player dribbles down the court with his opponent in hot pursuit. He stops, fakes right and left then goes for the shot—swish! The ball drops through the hoop.

This is basketball, but not the kind you play with a real basket and ball. It's *One on One*, a fast-action home computer game that was written by 19-year-old Eric Hammond. Eric didn't design the game alone, however—he got some courtside coaching from basketball superstars Larry Bird and Julius "Dr. J" Erving.

Eric worked hard to make the game play in *One on One* as close as possible to real on-court action. "I wanted whoever played it to forget they were playing a computer game," he says.

Eric started working on *One on One* when he was 17. He had already published three games—*Marauder, Night Flight* (since renamed *Battle Cruiser*) and *Maze Craze Construction Set* (a "best game of 1983" choice in ENTER's "User Views" section).

"I was ready to start working on something new when Electronic Arts approached me with the idea of writing a football game," recalls Eric. "I immediately suggested basketball, because I've always loved playing it, and I knew it could work on the computer."

"We decided to get two professional players to help us write the game," says Eric. "We thought about basketball's best—that's when Larry Bird and Dr. J came to mind. We told them about our project and they went for the idea."

Working with Larry Bird and Dr. J was "a real thrill," Eric says. "They had some great ideas, too, like putting bar graphs on the side line to measure a player's level of fatigue, and enabling players [on the screen] to spin the ball."

Eric also took some of Dr. J and Bird's statistics and programmed them into the game. The shooting and rebounding percentages, blocking abilities, and speed of the *One on One* characters match those of the real players. "All of these touches add a lot to the gameplay," says Eric.

This fall, Eric will start his sophomore year at Principia College in Southern Illinois. He plans to major in music. "I like computers, but this is a good time to get to know about some other things."

When Eric graduates, he plans to go back to game design. "I'd like to be more of a game designer and concern myself with the aesthetics of a game, rather than be a programmer," he says. "In fact, I'd be happy to do as little programming as possible — because, no matter what anybody says, it's not fun. It's just a way to see your ideas take shape."

For the time being, Eric says he isn't as concerned about bugs and bytes as he is about making his school's varsity basketball team.

Space-Age Musician

In outer space, you can't hear a sound. But if you could, 21-year-old Mark Halliday may have created the perfect instrument for lunar music—a laser harp.

This harp uses laser beams instead of strings or keys to make music. Best of all, says Mark, the laser harp does "more than make music. It also creates a very exciting visual image."

Mark, a senior at Dartmouth College in New Hampshire, began working on the harp at school. After about 10 weeks he had built a prototype—a small version of the full-scale model he hopes to eventually build.

The prototype is a wooden frame, about one foot tall. On the bottom piece of wood there are 24 reflecting plates. On the top are the same number of light-sensitive transistors.

The laser acts as a direct interface with a Synclavier synthesizer. When the laser beam hits the plates, it is reflected into the transistors, and no sound is made. When the beams are broken, however, a tone is produced.

Mark hopes his full-scale laser harp will be finished sometime this fall. Then it could really be time for a new wave laser beat.

Computing the Races

The horses are at the starting gates.. .and they're off! Thanks to 17-year-old David Stewart and his Sinclair Spectrum computer, race fans may already know who's going to win.

David, from Darlington, England, wrote a program that enables his computer to predict winning horses with about 70 percent accuracy. David's racing forecasts are published in the *Sun*, London's largest-selling newspaper. His predictions are also broadcast over 10 regional BBC radio stations.

© KEN GOFF

Dave uses hi-tech horse sense.

David had taken a computer class at school, but his interest in computers really grew out of his enthusiasm for horse racing. "I wanted to find a way to predict the winners," he says, "and I realized it was a perfect job for a computer."

It took David about two years to develop a program to spot winners. To begin, he entered racing statistics on his Sinclair Spectrum. He used statistics about past performances of horses and jockeys, and the conditions and tracks where they ran their best and worst races. Then, the night before a race, David enters specific weather and track conditions and the details of who is running in a particular race.

David hasn't yet earned tons of money with his computer screen predictions—just a small salary he receives from the *Sun*—but he's enjoying life near the fast lane. "I never expected my predictions to be so successful," he admits. In fact, everyone seems pretty pleased with what you might call David's personal version of a gallop poll.

Silicon Touchdown

NFL coaches may soon thank 21-year-old Kevin Guthrie—and a computer—for making pre-game preparations a little easier.

Kevin did his computer football work at Princeton University, from which he was graduated this past June. During his senior year at college, Kevin wrote a program that gives coaches direct access to information that can help them get ready for games.

In order to prepare for an upcoming game, a coach needs to review the opposing team's strategies. This information is generally stored on a computer. But in the past, coaches often had to sift through mountains of irrelevant facts and figures to get to the data they needed.

"My program," says Kevin, "lets the coach specify the information he's interested in receiving. It's more efficient." It also enables the coach to use a computer to draw and save plays.

Kevin worked for about three months on Princeton's IBM mainframe to complete the program. Right now, he's not planning to try to market his program. He has more immediate concerns—like preparing for a season as wide receiver for the Seattle Seahawks professional football team.

Do you know a Pacesetter? If so, send a short note describing him or her to Pacesetters, ENTER, 1 Lincoln Plaza, N.Y., NY 10023. If we write up your story, you'll get an ENTER T-shirt.

CONNECTIONS

EDITED BY SUSAN JARRELL

Musical Contest

Are you a Commodore owner who loves to make music? If so, check out En-Tech's Computer Songwriting Contest. This software company is offering cash prizes and free recording time in a Hollywood studio to the contest winners.

Songs must be written with En-Tech's *Studio 64* package for the Commodore 64 ($39.95). You can enter as many songs as you want, but each song must be under five minutes and on a separate disk. Three songs will be picked. The top songwriter will receive $1000, and the second place winner will get $500.

The deadline is November 1, 1984. Winners will be announced on December 15. For more information, write: Computer Songwriting Contest, P.O. Box 185, Sun Valley, CA 91353.

More Bulletin Board Info

New bulletin boards pop up all the time. Here are three of the more interesting:

- Logo fans who suffer from insomnia will be happy to hear about the Young Peoples' Logo Association Midnight Turtle BB. This free information exchange, open from 7P.M. to 7A.M., lets you chat with other users, get technical advice, and download 10 Apple Logo programs. For more information, call (214) 783-7548.
- Want to be the first kid on your block to know the temperature in Istanbul? Just plug into the free Climate Assessment Data Base. This 24-hour service is provided by the National Meteorological Center in Washington, D.C. You can access lots of weather data. For start-up information, including a password, call Vernon Patterson or Joanna Dionne at (301) 763-8071.
- Tune in to Ralph Record's free bulletin board (called Big Brother) to get music news, record charts, reviews and a store catalog. Ralph Records is a record store in San Francisco that specializes in new wave music. They're also working on another system for downloading music and drawings. For more information, write: Ralph Records, 109 Minna #391, San Francisco 94105. You can call (415) 543-4085 for information.

© MARY LYNN BLASUTTA

Help for Timex Owners

Attention die-hard Timex/Sinclair fans. Games to Learn By, Inc., is continuing to sell Timex computers, books and software. They will be sending out a free bi-monthly newsletter with announcements and information for Timex owners. Marty Warner-Dubay, a former Timex software engineer, says the company will be developing new software (and hardware!) for T-S machines. For information: Games to Learn By, Inc., P.O. Box 575, 2 South Street, Williamsburg, MA 01096.

Book Nook

Having trouble finding the one computer book you need? Or has that one book gone out of print?

Don't panic. The Computer Literacy Bookshop may be able to help. This bookstore, located in the heart of Silicon Valley, carries over 5,000 computer titles.

The bookshop offers a catalog (around $3 a year, including updates) and a free newsletter covering store events, sales, new books, and speakers. For more information, write to Computer Literacy Bookshop, 520 Lawrence Expressway, Suite 310, Sunnyvale, CA 94086. If you're in a hurry, call (408) 730-9955.

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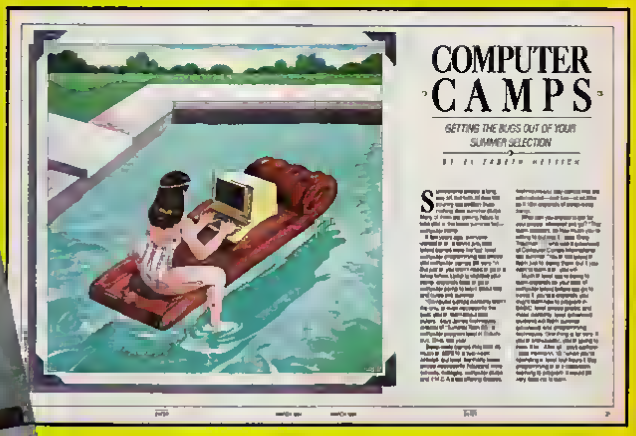

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THE EMPIRE'S COMPUTER SECRETS

HIGH-TECH MOVIEMAKING IN THE LAND OF 'STAR WARS'

"Come here," says Ed Catmull mysteriously. "I want to show you something."

He opens the door to a small, dark room. Computer display screens glow from every corner like eyes. In the dim light, technicians are hunched over keyboards, working intently.

Catmull turns to the nearest computer and types in a command. Images flash onto the screen—mountains, clouds, a road with a rainbow arching over it. The images look so real it's hard to believe they were generated by computer.

"We're going to be making entire films this way someday," Catmull says proudly. "We'll create whole new worlds. We'll generate characters, monsters and aliens. Everything but the human actors will come out of computers."

We are in the computer headquarters of Lucasfilm, standing near the place where Luke Skywalker and Han Solo were created. Lucasfilm is the movie company that made *Star Wars*, *Indiana Jones*, *The Search for Spock*, and some of the most amazing special effects ever. But for Ed Catmull, director of the studio's Computer Division, all that is history. The future of Lucasfilm—and perhaps the future of movies, games (see sidebar) and entertainment—is happening right here with these computers.

The Computer Division's team of programmers and artists has already created some memorable movie images, including the barren moon that becomes a green planet in the *Wrath of Khan*, the Death Star that looms ominously in *Return of the Jedi*, and the special sound effects in *Indiana Jones and the Temple of Doom*. But Catmull admits most of his team's best work is still experimental. "So much," he says, "is happening here."

CREATING A DREAM

The Lucasfilm computer division was born five years ago. *The Empire Strikes Back* was about to open, and George Lucas was looking for someone who could move his film company into the computer age. Ed was director of the well-known computer graphics department at the New York Institute of

RIGHT: Lucasfilm's Ed Catmull experiments with hi-tech moviemaking.

BY SUSAN MEYERS

© DOUG MENUEZ

Technology when George found him.

"George wanted me to look at the entire process of how movies are made, and figure out how computers could make it more manageable," Ed recalls. In 1980, Catmull drew up a plan and hired his team of top computer programmers and graphic artists.

The Lucasfilm Computer Division is organized in four sections—computer graphics, games, digital audio effects, and video editing. Ed spends some time "writing code" (programming) in the computer graphics section. "Most of the time, though, I'm making sure things go smoothly between the different sections," he says. "Each section works on its own projects, but there's a free exchange of ideas."

This free exchange has helped Catmull and his team to innovate. Their first products, for instance, are a pair of new movie-making machines. It seems fitting that the studio that brought droids like R2D2 and C3PO to movie screens is now bringing machines like EditDroid and ASP to the movie industry.

EditDroid is a computerized movie editor. It provides random access to any frame in a movie. Using EditDroid, a film editor can work more quickly and experiment more easily with the way a movie comes together. EditDroid's sidekick, ASP, is the first computerized *Audio Sound Processor* able to mix, edit and synthesize sounds. ASP and EditDroid together will enable moviemakers to work on sound and pictures at the same time—something that's never been possible before.

High-tech tools like these, explains Ed, will let "computers do

Astounding space scenes, like* Star Trek III's *destruction of the Enterprise, were created by Catmull's team.

RIGHT: Computer sound effects add zap to Indiana Jones' latest adventure

the drudge work" while movie-makers, gamemakers and other artists "concentrate on the creative element "

In the darkened computer graphics room, Catmull turns to a screen containing an image of four billiard balls so perfectly modeled that they appear to be three-dimensional

"Here's our big discovery," he says

But it's not the illusion of three dimensions that Ed is talking about. It's the faint smudging effect—a slight blur of motion on the surface of the spheres—that he points to.

"You'll notice in standard animation when a character moves across the screen you always see a second image—a sort of shadow —following along," he says "That's because every frame of film is actually shown twice to eliminate flickering.. We've discovered that if we blur the edges of an animated form, we can get a real feeling of motion and eliminate that second image effect "

Things aren't always what they appear to be in Lucasfilm's computer world. This winding road (above) doesn't really exist. It was created entirely on a computer.

With a gleam in his eyes, Catmull continues: "I see a whole computer animation industry developing, with Lucasfilm in the lead With computers, we'll eventually be able to produce feature-length fantasy films—fantasies with elements that could never be done with special effects. ..They'll be different from the original animated films," he adds. "They won't look like flat drawings They'll be three-dimensional and we'll be able to add human actors."

Catmull knows this kind of film will take more computer power than is currently available. But working with former Disney animator Don Lassiter, Ed Catmull's team has

LEFT. Lucasfilm's computer team helped create this 3-D planet in Jedi

already created a computer-animated figure. André, a cute character with oversized head and a round nose, is about to star in a demonstration film being produced by the Computer Division. Ed admits there are obstacles to creating a believable animated character "that can move through fantasy worlds in a convincing way." But André, he says, is a beginning.

"Our big discovery!" says Catmull, pointing to the billiard balls. The computer-created image (above) is a first step towards animation that looks like real motion.

COMING FULL CIRCLE

In a sense, André and the other animation breakthroughs are bringing Ed Catmull's life full circle. "What I wanted to be was an animator for Walt Disney," says Ed, who grew up in Utah. "I was always drawing. I liked to fantasize and create my own worlds."

Unfortunately, says Ed, "I found I just couldn't draw well enough." He changed course, and began studying physics. Then he took a class in computer graphics at the University of Utah.

"My first big project was to [computer] animate a hand," he remembers. "It was wonderful." His eyes light up at the memory. "When I saw that hand move, I knew right away this was for me."

Ed is still enthusiastic about his work. So is his wife, Susan, who works with him at Lucasfilm—she's operations manager of the computer division.

In fact, Lucasfilm has input from the entire Catmull family. Ed and Susan's children—David, 13, Benjamin, 9, and Michael, 4, "think it's great having parents who work here," says Ed. "They go to advance screenings of movies...[and] help when we test our video games."

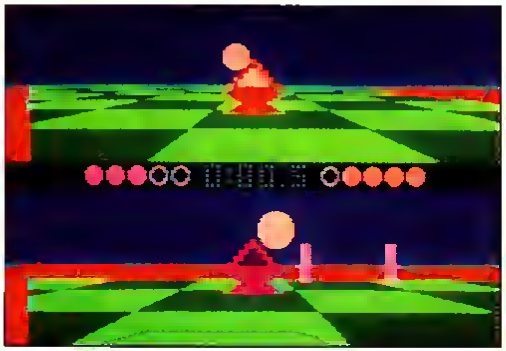
But it's not just being around movies and games that makes their father so excited about his work. It's the challenge. "I like to learn things," he says, "and to figure out things that other people can't solve.

"I've been working on computer animation for the last 15 years because I'm convinced how important it is... I believe we are developing a new way of making pictures and a new way of telling stories."

SUSAN MEYERS is ENTER's West Coast Editor

THE EMPIRE'S COMPUTER GAMES

Lucasfilm and Atari Join Forces



Atari/Lucasfilm's first*—Ballblazer *and...

Rescue On Fractalus!*—create new game worlds.*

"There's something tremendously exciting about bringing life to a new world, and then bringing that world into our own," says Lucasfilm designer David Fox.

Fox isn't talking about *movie* worlds. He's part of the Lucasfilm Computer Division Games Group, and the "worlds" he's talking about are created in the new Atari/Lucasfilm computer games, *Rescue on Fractalus!* and *Ballblazer*.

These two games are the result of 18 months' work by some of the country's top software designers. They also demonstrate how Ed Catmull's Computer Division is changing the games we play and the movies we watch.

Ballblazer is a split-screen, high-tech handball game. It pits player against player, player against Droid, and even Droid against Droid. *Rescue On Fractalus!*, an interplanetary rescue mission, has players trying to save fellow pilots and avoid enemy Jaggi attacks.

In creating both games, the Games Group applied techniques perfected in Lucasfilm movies like *Star Wars*. Take, for example, the sound effects in *Rescue on Fractalus!* "Sound [is] used to tell the player about events not shown on the screen, like the pilot knocking on the door or the airlock opening," says David Fox. "This technique of providing vital information by sound rather than sight is common in motion pictures, but rare in video games."

The Games Group worked hand-in-hand with other Computer Division sections. When the Games Group wanted to create a unique environment for the planet Fractalus, they called on Loren Carpenter. Officially, Carpenter is a member of the Computer Division's Graphics Group. But it was his expertise in fractals—a kind of geometry that describes the irregular forms found in nature—that brought the new planet to life.

Using fractals, Carpenter and the Games Group created *Fractalus*'s 3-D style landscape. "You can go as far as you want in any direction and never go off the edge," says David Fox. "The entire landscape of the planet exists in the computer's memory."

It would have been impossible to create that kind of environment without Loren Carpenter's help. This team effort is the beauty of working with the Computer Division, says Group leader Peter Langston. "If we have a problem in games, we can go to computer graphics and see if they've got an answer," he explains. "We talk problems over at lunch, and they get solved." ◘

Ballblazer and Rescue On Fractalus! *are available from Atari for all Atari home computers. Both games will be available in October for Apple, IBM and Commodore home computer systems.*

Rock on

the Road

COMPUTERS LIGHT UP '84's HOTTEST TOURS

BY PATRICIA BERRY AND JOE RHODES

The house is packed. Restless fans are tossing frisbees and calling to each other across the crowded arena. Slowly, the lights dim and people begin moving to their seats.

Suddenly, multi-colored beams sweep over the crowd in criss-crossing patterns. An invisible announcer first silences the mob, then brings it to its feet with a simple request. "Ladies and Gentlemen, please welcome . *Genesis*!"

An array of lights sprays the band members with color and brightness. The English threesome, with Phil Collins singing lead, launches into a medley of their popular songs as brilliantly colored lights leap around the arena.

This summer, similar scenes are brightening concert stages across the U.S. Groups like Duran Duran, The Police, The Jacksons, ZZ Top, Culture Club, and Van Halen are filling concert halls with shows that

Genesis in concert: Hundreds of computer-controlled Vari-Lites shower the band.

How to talk your parents

There's a new Apple® Personal Computer called the IIc that's so complete and so affordable that getting your parents to buy one should be easier than learning Logo.

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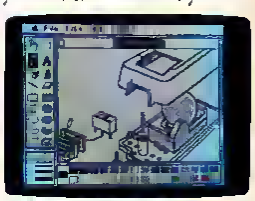

With MousePaint, you could become the next Picasso. Or the next Charles Schulz.

You might also mention that it's a bargain. It comes with everything you need to start computing in one box—including an RF modulator that lets you hook it up to your TV the moment you get it home. There's even a free 4-diskette course on computer basics they

into parting with $1300.

can use when you're too busy to show them how.

All for under $1,300.**

Of course, they probably won't want to hear that it runs more games than any other computer in the world except the Apple IIe.

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Even if they always keep it at home.

The IIc Bag has room for a power pack, software, even notebooks. So it's worth a few extra bucks.

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But assure them that your IIc can grow just as fast as you do.

Now, if all of these carefully reasoned arguments fall on deaf parental ears, don't despair. There is still one thing more you can do.

Get a paper route.

*The IIc alone weighs just 75 pounds. Power packs, monitors, printers, modems and mice can make it as heavy as you'd like. **Suggested retail price. © 1984 Apple Computer Inc. Apple and the Apple logo are trademarks of Apple Computer Inc. For an authorized Apple dealer nearest you, call **(800) 538-9696.** In Canada, call **(800) 268-7796** or **(800) 268-7637.**

Rock on

Hovering over center stage like a strange space ship, Vari-Lites are programmed for the evening's performance.

include some of the most spectacular lighting effects seen anywhere. None of these groups could have dazzled audiences quite as much if it wasn't for computers.

ROCK & ROLL LIGHTING TO GO

Until recently, the light shows that accompanied rock concerts were too expensive, too fragile, and required too much equipment to take on long road tours. But the invention of a computerized show light changed all that.

Vari-Lites are little black boxes that emit powerful beams of light. They can change to any of 60 colors in a fraction of a second. They can rotate in a full circle, move up and down, and change the width, shape and intensity of their beams.

Vari-Lites are the brainchild of Jim Bornhorst. Bornhorst is an engineer at Showco, a high-tech entertainment production company based in Dallas, Texas.

Before Vari-Lites were invented, setting up concert lights was "terrible," says Bornhorst. Conventional lights, he explains, *cannot* change color. In order to get any kind of effect, concert lighting designers actually had to turn these lights on and off. If a designer wanted another color to appear on the same part of the stage, colored filters had to be placed in front of the lights.

In the late 1970s, Bornhorst and a team of engineers built a motorized system that could move any of 21 small colored glass filters in front of the light source. The system could also change the intensity and shape of the beams from a narrow pinpoint to a wide wash of light, and everything in between.

Genesis was the first band to use Vari-Lites. The group had 50 of them on its 1981 tour. This year, Genesis is using 196 Vari-Lites—the largest number anyone has taken on the road yet.

The members of Genesis also had a big hand in developing the light show for their recent international tour. Before going on the road, Phil Collins, Tony Banks and Mike Rutherford "let Showco know the dramatics they wanted to convey to the audience," explains tour manager Andy Macknll, adding, "Then Showco's technicians went about creating those dramatics."

the Road

HOW ARTISTS CREATE LIGHT SHOWS

If you've seen David Bowie's "Modern Love" video, you've seen Vari-Lites at work. Moving shafts of light make it appear as if Bowie is passing through a swinging gate of moonbeams. Showco lighting designer Allen Branton used Vari-Lites to get these special effects.

Branton also used 40 Vari-Lites in Bowie's "Serious Moonlight" tour last year. They were part of a complex lighting rig that also included hundreds of conventional lighting fixtures. But because of the Vari-Lites' ability to move and change color, they became the centerpiece of the lighting design.

Designers often work through a concert's "scenes" with the performers before the tour starts. The performers want to find the best way to reflect their music. Some performers, like Michael Jackson, even do their own lighting designs. (The lighting for the Jacksons' tour this summer was, in fact, designed by Michael.)

Allen Branton had to create Bowie's light show in a hurry. He had only 10 days (instead of the usual four weeks) to pull it together.

"David and I would play word association games," Branton says. "On a particular song I'd say, 'Just give me a word or a phrase to get me started, and I'll show you some different lighting ideas.'"

For instance, Bowie wanted a "horror show" mood for his song, "Scary Monsters." Branton, working at the Vari-Lite computer console, was easily able to call up combinations of dark, greenish lighting effects.

Vari-Lites "gave David the freedom to do what he wanted," says Branton. "He'd change his mind about the choreography and we'd reprogram the lights to fit whatever he wanted on stage. If we had to do that with conventional lighting, it would have taken hours." Branton adds, "Because I had Vari-Lites, he could imagine anything and I could light it quickly. David could go read the newspaper for 15 minutes, and I'd have it done."

The Police also found Vari-Lites made a difference. On their recent *Synchronicity* tour, they travelled with 29 of the computerized light boxes. "They're fantastic," says Nick Sholem, their tour lighting designer.

Sholem usually used Vari-Lites in combination with other standard

© LEWIS LEE

Computerized lights saved a Police concert when regular lighting failed.

Rock on

© LEWIS LEE

Vari-Lites (TOP) revolutionized lighting with computer control.

rock and roll lamps. On two Sting songs, however—"Footsteps" and "Tea in the Sahara"—he used the Vari-Lites alone.

"'Footsteps' is a song about dinosaurs and man," Sholem explains. "In performance, it needs a jungle feel. I used dry ice, and green, turquoise and blue-green lights to get the jungle effect. As a beat takes over in the song, the Vari-Lites move with the beat. Other lights can't do that."

Other lights probably never saved a Police concert—but Vari-Lites once did. The Police were 10 minutes from starting their show in Barcelona, Spain, when the lighting system's power generator gave out.

Nick Sholem decided the entire show could be run with only the 29 "Varis," as he calls them, hooked up to the sound system (which uses much less power than a lighting system does). He used a preprogrammed color wash of light, and tapped other commands into the Vari-Lite board as the show went along.

USER-FRIENDLY LIGHTING

Vari-Lites give an enormous amount of freedom to touring rock bands and their lighting designers. But the power of these lights has to be handled by someone each night—and that created a new problem. "If you gave a man just raw controls where he had to hunt and peck, trying to find a color, it would be totally useless," says Vari-Lite inventor Jim Bornhorst.

The solution: A computerized light board that could locate and operate every color, beam size and beam direction—in a split second.

One Vari-Lite board can operate up to 96 lights at once. It stores up to 256 lighting commands in any combination of colors, beam sizes and intensities. Other commands can be added manually during a show.

Bornhorst knew that the people using Vari-Lites would not be computer pros. The system *had* to be user-friendly and look similar to conventional light boards. So the lighting board was designed with all the functions, knobs, levers and pushbuttons clearly marked. There is no keyboard, no need to understand menus or computer lan-

the Road

guages. The lights themselves plug into the rig by a single cable.

"When you're doing five or six shows a week, working 17 hours a day, people tend to get a little fuzzy, and mistakes happen," says Bornhorst. "It really affects the performance if there are problems, so everything has to be as simple as possible. It [the entire lighting rig] has to be thrown up and down night after night, and it's got to work."

The tell-tale difference between the Vari-Lites console and conventional light boards is a computer screen. The Vari-Lites monitor graphically displays the lights set up along a rig, and the design programmed into the computer. Using the cursor, the lighting design can be changed at any time.

"The lighting designer adjusts the controls until the particular light he's working with is set up where he likes it," explains Bornhorst. The designer then moves the cursor to adjust each light in the rig, deciding which colors, which movements and which spots he wants to illuminate in that particular moment of the show. "Finally," Jim notes, "the information is stored in the computer."

Once on the road, a board operator usually takes over running concert lights. And movers, called "roadies," move the system from town to town, handling the setting up and taking down.

Unlike conventional lights, Vari-Lites are made strong enough to withstand a lot of abuse. "I've seen the Vari-Lites rack fall off the stage and live," says Bornhorst.

MORE CONCERT HIGHLIGHTS

Lighting is the flashiest way computers have changed concerts, but it's not the only one. More and more rock stars are taking their electronic instruments on the road.

Some performers are even touring without *any* backup musicians. Art rocker Laurie Anderson (on her new album, *Mr. Heartbreak),* is this year's most notable example. Anderson travels with a musical computer called a Synclavier and a voice synthesizer to color her act with new wave sounds.

Stars like Thomas Dolby, Stevie Wonder, and The Cars' keyboardist Gregg Hawkes also feature electronics in their concerts. They use computerized synthesizers and digital drum machines to recapture their album sounds on stage.

Even computer graphics are going on tour. A two-man synthesizer band in Texas, called T42, uses an Apple II as part of its show. The band displays computer graphics on monitors at the front of the stage, while a programmed voice synthesis module acts as a backup singer on some of the band's numbers.

Whatever the performance on stage, one thing is certain. Vari-Lites will be showering rock stars with brilliant light shows until someone comes up with a better way. And no doubt Showco and Jim Bornhorst are already thinking along those very lines.

PATRICIA BERRY is an ENTER associate editor. JOE RHODES is a Dallas freelance writer.

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David Bowie moves through computer moonbeams in his video.

THE WRITE

THE WORD ON WORD PROCESSING PROGRAMS

Word processing may sound like you're tossing a dictionary in a blender. But it's really one of the most important uses for your home computer.

Word processing lets you use a computer like a typewriter to create book reports, term papers, letters, poems, invitations, and other documents. But there is a *big* difference: word processing lets you make changes *before* anything gets down on paper.

Until recently, word processing software has been costly and complex. But inexpensive, easy-to-use programs are now available. If you know how to type, you're more than halfway to being an ace word processor.

Whether you use an Apple, Atari, Adam, Commodore 64 or VIC-20, TRS-80 or IBM computer, you can get started. ENTER has put together a chart (see next page) rating many of the leading lower-priced (between $35-$150) word processing packages. There is no such thing as the *ideal* software, but this chart can tell you the

STUFF

BY PHIL WISWELL

advantages and disadvantages of each program.

To help you decide which features you'll need most, we're going to give a guided tour of the four functions of word processing—Writing, Editing, Formatting and Printing.

WRITING: Word Rap

When you're using pencil and paper or a typewriter, it's easy to look at the whole page—or several pages—at the same time. But when writing at a computer, you can only see what's displayed on the screen.

Display refers to the number of characters (letters) and lines a word processor shows on a screen. The width of display depends on the software *and* monitor you are using.

If you use a TV set with your computer, you can't display more than 40 characters per line, and 25 lines per screen. That's true with any software that you use. You *can* get an 80-character line by using a special monitor (or, in some cases, by using an 80-column card). But

with some word processing programs, a monitor will be a waste. *AtariWriter*, *Text Wizard*, *Home Office*, *SmartWriter* or *Easy Script 64* only display 40 character lines on any screen.

There is one program that breaks these rules. *OmniWriter & OmniSpell* will let you see an 80-character line, even on a regular TV screen. The screen actually scrolls left to right as you type.

Automatic word wrap happens when you reach the end of a line. If a word is too long to fit on a line, it is automatically transferred to the beginning of the next line, or split at the proper point with a hyphen. Every program has this feature, except for *Easy Script 64*, which often splits words at the wrong spot. For example, it may take a word like noodle and put "n" on one line and "oodle" on the next.

EDITING: Getting It Right

Unless you're a great writer who never ever makes mistakes (if so, please get in touch with us), you'll want a word processing program with editing functions that makes it

WRITER'S GUIDE: ENTER's List of Word Processing Programs

PROGRAM/PUBLISHER PRICE	COMPUTER	MEDIA	CHARACTERS PER LINE TV/MONITOR	LINES PER SCREEN	DELETE?†
APPLE WRITER IIe (Apple, $195)	Apple IIe	disk	40/80	24	C L
ATARIWRITER (Atari, $99.95)	All Atari computers	cartridge	36/36	21	C L
BANK STREET WRITER (Broderbund, $69.95-79.95)	Apple, Atari, Commodore 64 IBM PC, PCjr	disk	38/80*	18	C
CUT & PASTE (Electronic Arts, $50)	Apple IIe, IIc, Atari, Commodore 64, IBM PC, PCjr, XT, Compaq	disk	37/80	21	C
EASY SCRIPT 64 (Commodore, $45.95)	Commodore 64	cartridge, disk	40/40	24	C L S P
ELECTRIC PENCIL (IJG, $90)	TRS-80 III, IV	disk	—/64	16	C L
HOMEWORD (Sierra On-Line, $69.95)	Apple, Atari, Commodore 64	disk	40/40	14	C W L
LEADING EDGE (Leading Edge Products, $100, $150 with Mail Merge)	IBM PC	disk	—/80	24	C W L S P
LETTER WIZARD (Datasoft, $49.95)	Atari	disk	38/74	20	C L
OMNIWRITER/OMNISPELL (HES, $59.95)	Commodore 64	disk	38/74	20	C L
QUICK BROWN FOX (Quick Brown Fox, $70)	Apple, Atari Commodore 64 VIC-20, IBM PC, PCjr	cartridge, disk	40**/80	24	C W L S P
SMARTWRITER (Coleco)	Adam	built in	36/36	17	C
THE WRITE STUFF (Harper & Row, $99.95)	Apple II*, IIe, IBM PC, XT	disk	40/80	22	C W L S P
WOROVISION (Bruce & James, $79.95)	IBM PC, PCjr	disk	—/80	20	C W L S P

†Guide to abbreviations: *C-character, W-word, L-line, S-sentence, P-paragraph. *IBM Only, **22 on VIC-20.*

easy to correct mistakes.

Editing commands can be confusing and difficult to memorize. *Text Wizard*, for example, never gives any on-screen menu to help you remember how to edit. Most other programs do offer some help. *Bank Street Writer* uses on-screen reminders on how to edit. *AtariWriter* uses letter reminders (such as "D" for delete, "M" for move and "S" for save) that are very easy to memorize. *Homeword* uses icons (pictures of file drawers, a trash can, etc.) for editing commands. Position the cursor over the trash can, press RETURN and—whoooosh!—that awful sentence is gone.

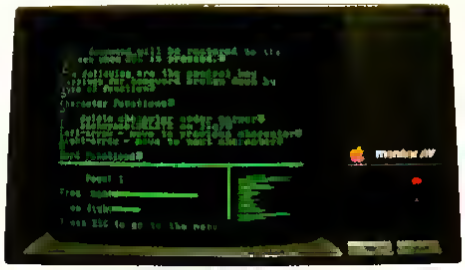
You'll also find that some word processing programs have separate screens for editing. In other words, they won't let you edit while writing. This is great for a beginner, but can slow you down after a while. *AtariWriter*, *Text Wizard*, *WordVision*, *TI Writer*, *Electric Pencil*, *Cut & Paste*, and *Easy Script 64* all let you edit while still writing.

Once you've figured out how and where to edit, you'll want to know how to insert and delete.

Inserting—adding words or sen-

LOCAL SEARCH & REPLACE	GLOBAL REPLACE	MERGE FILE	PRINT PREVIEW	BOILER-PLATING	UNDER-LINE	BOLDFACE
✓	✓	✓	✓	✓	✓	
✓	✓	✓	✓	✓	✓	
✓	✓					
✓	✓	✓	✓	✓	✓	✓
✓	✓				✓	✓
✓	✓	✓	✓		✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓		✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓		✓	✓	✓
✓	✓		✓		✓	
✓	✓	✓	✓	✓	✓	✓
✓	✓		✓		✓	✓

Prices indicated are current as of June, 1984, and are the manufacturers' suggested prices. They may vary according to dealer, system used, etc.



Homeword *uses icons for easy editing.*

tences to what's already written—is easy with most of these programs. With *Letter Wizard*, for example, you go into insert mode. The text on the screen shifts to make room for what you're adding. Some programs are more difficult. *TOTL Text 2.6*, for instance, requires that you create spaces before inserting characters. *SmartWriter* makes you answer a series of questions before you insert a single word.

Deleting—removing unwanted words or sentences—is simple with most of this software. But *SmartWriter* is slow. It takes as long to delete a single letter as it does to delete an entire sentence. *WordVision*, a very powerful program, requires you to memorize complex commands. (*WordVision* gives you 31 stick-on overlays that remind you which keys perform which function. But who wants stickers on the keyboard?)

Cut & Paste is about the easiest to use for inserting and deleting. You only have to learn two commands—cut and paste. With this, you can add or remove any amount of text.

Block Functions give you the ability to move sentences and paragraphs around in a document. They also let you copy or erase a sentence or paragraph. These functions are similar in all the word processing programs here. But *Cut & Paste* and *Bank Street Writer* offer one very useful extra—unerase. This command lets you restore deleted text after it has disappeared from the screen.

There's no ideal word processing software. There are good and bad programs.

Local and Global Search and Replace may sound like an international expedition, but it's a useful word processing function.

For example, you've just written a report about the author Ernest Hemingway—but you've misspelled his name Earnest Hemmingway.

In a local search and replace, you type in "Earnest Hemmingway" and the cursor jumps to each place where the name appears, one at a time. You can then make your corrections. In a global search and replace, you can tell the computer to search for Earnest Hemmingways, and replace each one. The changes will be made throughout the text all at once.

This search and replace function is especially helpful with a combined program like *OmniWriter & OmniSpell*, a word processing/spelling checker program that comes on the same disk. *OmniSpell* will search the text for misspellings against its built-in 30,000-word dictionary.

FORMATTING: Looking Good

When the words are just right, it's time to format the document. This simply means setting up the way you want your writing to appear on the printed page. Formatting lets you do simple things like set margins and put one or two spaces between lines. But it can also let you make more exotic changes before you print something out.

File Merge lets you turn two separate pieces of writing into one. This is important with software like *HES Writer 64*, which only allows 727 lines of text per file. It's also useful with the *Text Wizard* program, which lets you create a database of names and addresses that can then be merged with letters.

Print Preview lets you see what something you have written will look like when it's printed. In *AtariWriter*, *AppleWriter IIe*, *Homeword*, *WordVision*, and *SmartWriter*, you can preview text in 80-character

***The user-friendly* Bank Street Writer.**

lines, even if you're not using a special computer monitor. The screen scrolls sideways like a small window over the larger document.

Headings and Footings are not hats and shoes. A heading is the word that appears at the top of the printed page, letting readers know what they are reading. (For example, at the top of each page for this article, we put the heading "Word Processing.") A footing is simply the page number you want to appear at the bottom of the printed page.

Some of the programs here let you enter both headings and footings. Some let you enter only one or the other. *SmartWriter*, for example, is not set up to enter either.

Boilerplating is a way of placing the same sentence, or paragraph, in several documents. Say, for example, you're sending the same letter to several friends. You can "boilerplate" the same letter in several printings, and simply change the name and greeting for each.

With *Quick Brown Fox* and *AtariWriter*, the printer will stop whenever you have indicated a blank you want to fill. Fill the blank and the printer continues. With *AppleWriter IIe* and *EasyScript 64*, you can merge a document with a list of insertions automatically. The computer and printer fill in the blanks with the information you want.

Unless you never make mistakes, get a program that lets you correct easily.

PRINTING: Hard Copy

Word processing software may offer features that let you underline, boldface, condense and center texts and make margins nice and even. But all these features are worthless *unless* you have a printer that can print these commands.

For example, *AtariWriter* gives you the ability to make double columns, *underline* and boldface your writing. But the Atari 1027 printer can only do underlining. The only software here that doesn't have this problem is *SmartWriter*, which is built right into the Adam printer.

When you know what kind of printing functions you'll need, make sure both your word processing software *and* your printer can make it happen. (ENTER will tell you more about printers for your computer in an upcoming issue.)

Which Software Is Best?

Now that you've taken our tour, you should understand what's involved in word processing. Now you have to understand your needs.

Will you be word processing every day? Will you use your word processor to create many different kinds of documents?

If you answered yes to those questions, I recommend you try *AppleWriter IIe* for the Apple, *AtariWriter* or *Text Wizard* for the Atari, *OmniWriter* or *Easy Script 64* for the C-64, and *Bank Street Writer* for the IBM PC.

If you're just going to write a school paper a few times a term and a few letters a month, then I recommend using the simplest programs: *Cut & Paste*, *SmartWriter*, *Bank Street Writer* and *HomeWord*.

In my opinion, *Quick Brown Fox* and *WordVision* offer many good features, but they can be confusing to use.

My best advice is this: Buy nothing until you've tried it. Try out as many word processing programs as you can in the store. Ask lots of questions about which software will work best with which printer.

And don't ever put a dictionary in a blender.

PHIL WISWELL is an ENTER contributing editor.

Portable Power

FOUR NOTEBOOK COMPUTERS

BY PAUL D. NADLER, KIM PAGAN
AND DAVID WEINSTEIN

Not too many years ago, nobody but King Kong could have held a computer in his or her lap. Today, anybody can. With notebook size computers, you can put your keyboard, screen and processor under your arm and take it anywhere.

But do you want to? Before working on this review, none of us had used a notebook computer. We knew that many people find them useful. But are these minimicros worthwhile for the average ENTER reader? That's what we decided to find out.

GOOD THINGS— LITTLE PACKAGES

We tested four computers that sell for about $800: the Epson HX-20, the NEC 8201, Radio Shack Model 100, and the Olivetti M-10.

We weren't surprised to find that these machines are more alike than they are different. Three of them—the NEC, the Olivetti and the Radio Shack—are manufactured by the same Japanese company, Kyocera Ltd.

Each is about a foot wide, two inches thick by eight inches deep, and weighs about four pounds. All have built-in liquid crystal displays (LCD's)—the same kind of display as many hand calculators. They all display text that is 40 columns wide by 8 lines deep (except for the Epson, which only shows four lines at a time). They all have comfortable, full-size keyboards, very much like those found on desktop computers.

These computers come with either 8K or 16K of RAM memory, expandable to 32K or more. And, unlike home computers, you can turn off the screen and leave the computer's memory on. In fact, David found that if you turn off the Olivetti or Radio Shack screens while a progam is running, it will continue when you turn them on again!

The four vary slightly when it comes to hooking them up to peripherals. For details, see the box on the following page.

OUR PORTABLE REPORT

One thing we discovered is that notebook computers are *fun*. We all had used computers before, but we wound up playing with these four portables for hours. Here are our findings.

EPSON HX-20: As David said, "We didn't have an absolute favorite machine, but the Epson came closest." Even more then the others, the HX-20 is a totally self-contained portable machine. It features both a built-in microcassette drive and a built-in microprinter. The microprinter is a handy little device, though David notes, "The paper is *very* narrow, and the ink smears."

Kim especially liked the HX-20's user's manuals. "I thought they were more understandable than any of the others."

© DEBORAH FEINGOLD

David and Kim exp[lore] portables' ups and do[wns]

The Epson has some drawbacks, however. Chief among them is its tiny display screen. At only 20 characters across by 4 lines down, the screen really limits the kind of work you can do. Epson is introducing a new model with a larger display, but it was not available when we did our comparisons.

RADIO SHACK MODEL 100: The Radio Shack Model 100 comes with a built-in modem and a telecommunications program. It's used by a lot of subscribers to services like The Source.

Kim thought the 100's manual was the worst of the group. The Quick Reference Guide, also included, is much easier to use.

Both the Olivetti and the Model 100 come with two built-in programs, called a Scheduler and an Address program. After using them both, David realized they are really the same program with different names. (Of course, it may be useful to some people to have the program stored twice.)

OLIVETTI M-10: The feature that sets the Olivetti apart is its tilt-up screen. This is a great idea and makes typing much easier. However, it doesn't lock in this position, and had an annoying way of slipping down.

Aside from that, we found the Olivetti very similar to the Model 100. Like the 100, it comes with a modem and telecommunications program, and includes ports for a printer and cassette tape drive.

Olivetti is working on software which will allow communication between their M-10 and any IBM-style personal computer. This would allow you to enter data anywhere, then load it into the bigger machine for processing.

NEC 8201: Although it doesn't have a tilt-up screen like the Olivetti, the NEC does have a slightly sloped surface which makes it almost as readable. It comes with a telecommunications program, but no modem.

We liked the NEC's cursor controls more than any other model's

PORTABLES AT A GLANCE

RADIO SHACK MODEL 100

PRICE: $799 to $999
MEMORY: 8 or 24K RAM, expands to 32K.
DISPLAY: 40 cols. by 8 lines. Adapter for full monitor available.
BUILT-IN SOFTWARE: BASIC, Text editor, telecommunications, Scheduler, Addresser.
MODEM: 300 baud modem built in.
DISK DRIVE: 5¼ inch. Uses standard cassette.
SPECIAL FEATURES: Optional case.

EPSON HX-20

PRICE: $795.
MEMORY: 16K RAM, expandable to 32K.
DISPLAY: 20 cols by 4 lines.
BUILT-IN SOFTWARE: BASIC and Ski Writer text editor.
MODEM: Optional.
DISK DRIVE: Not available.
SPECIAL FEATURES: Built-in micro-cassette and printer, musical tone generator, hard carrying case. AC adapter included.

NEC 8201

PRICE: $599
MEMORY: 18K RAM, expands to 64K.
DISPLAY: 40 cols. by 8 lines. Full-size monitor adapter planned.
BUILT-IN SOFTWARE: BASIC, text editor, telecommunications.
MODEM: Optional.
DISK DRIVE: 3.5-inch. Uses standard cassette.
SPECIAL FEATURES: Clustered cursor keys, sloped keyboard.

OLIVETTI M-10

PRICE: About $800 for basic model.
MEMORY: 8 or 24K RAM, expands to 32K.
DISPLAY: 40 col. by 8 lines. Full size monitor adapter planned.
BUILT-IN SOFTWARE: BASIC, Text editor, telecommunications, Scheduler, Addresser.
MODEM: 300 baud modem built in.
DISK DRIVE: Not available.
SPECIAL FEATURES: Tilt-up screen. Connect to IBM PC in future.

They are conveniently positioned in a "cluster"—up is up, down is down, left is left, and right is right. The NEC can be expanded to 64K—twice that of any of the others.

SHOULD YOU BUY ONE?

We had a lot of fun playing with these computers. But we weren't sure how we'd use one in our daily routines.

"I wouldn't use them to take notes in class," says David. "I can see more on a page of paper than on these little screens. Once I used it on the subway, but I felt pretty silly."

Lack of software is another problem. "These computers haven't got all the software kids need, especially good games," Kim says. "Most of their software is for business use."

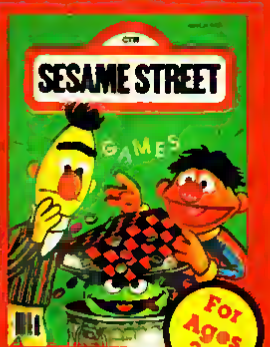
"But," David adds," a notebook computer might be right if someone else in your family needs a portable computer, maybe for their job. Then the rest of the family could use it at home to learn programming, do homework, or whatever."

A notebook computer, we agreed, is not a replacement for a regular home computer. But if you or someone you know gets the urge to compute in odd places—on a hike, or on the bus—the notebook computer may be what you want. E

DAVID WEINSTEIN, age 17, and KIM PAGAN, age 13, are students in New York. PAUL NADLER is a freelance writer.

The NEC 8201 used for this review was loaned to ENTER by Washington Computer Services, NYC.

ENJOY WITH SESAME STREET



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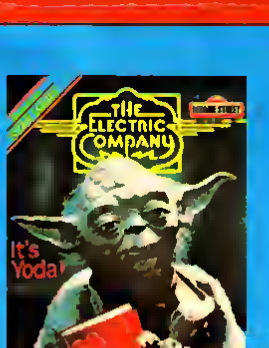
8HPT2

ENTERTAIN WITH ELECTRIC COMPANY



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8HPU0

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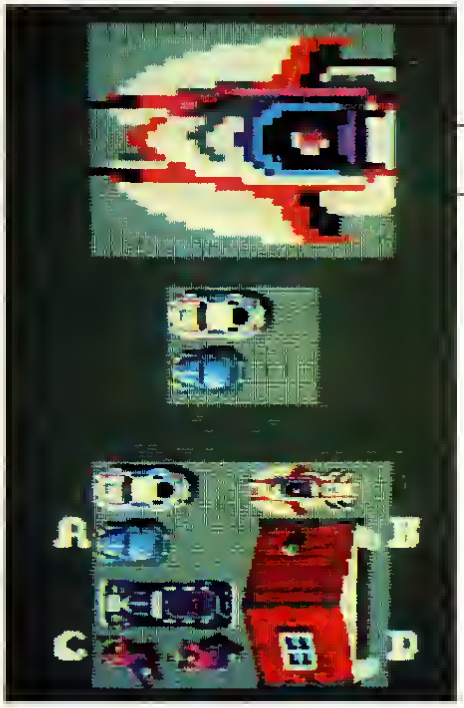
8HPV7

The Making of an ARCADE GAME

BY ROBERT CULICOVER • PHOTOS BY MARC POKEMPNER

Sure, it's only a game. But it takes the same kind of planning, care and technology to create an arcade game machine as it does to create a new computer. In our "Game Makers" story (February 1984), we looked at the birth of an arcade idea. Now ENTER will show how machine hardware comes together at one game maker's facility—the Bally Midway factory in Franklin Park, Illinois.

The game is Spy Hunter, *billed as "the driving game of 1984." A great deal goes into its shiny game cabinets—besides a steady stream of shiny new quarters.*



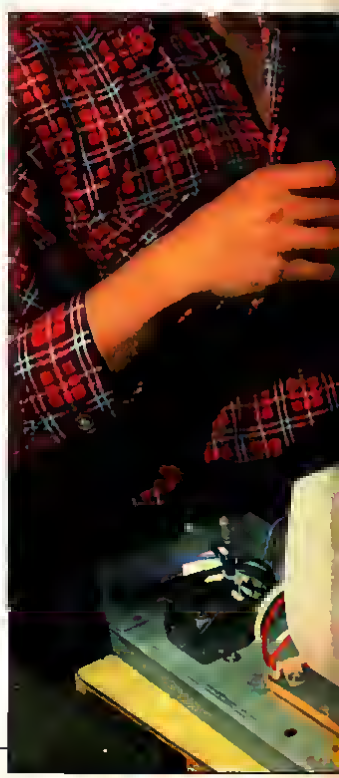
1

CREATING BY COMPUTER

To create *Spy Hunter* and most other arcade games, a team of designers works for about a year.

First, the rules and moves of the game are outlined. Then, using a "mouse" controlling device and a powerful mainframe-based art system, designers draw game elements on a video screen (LEFT).

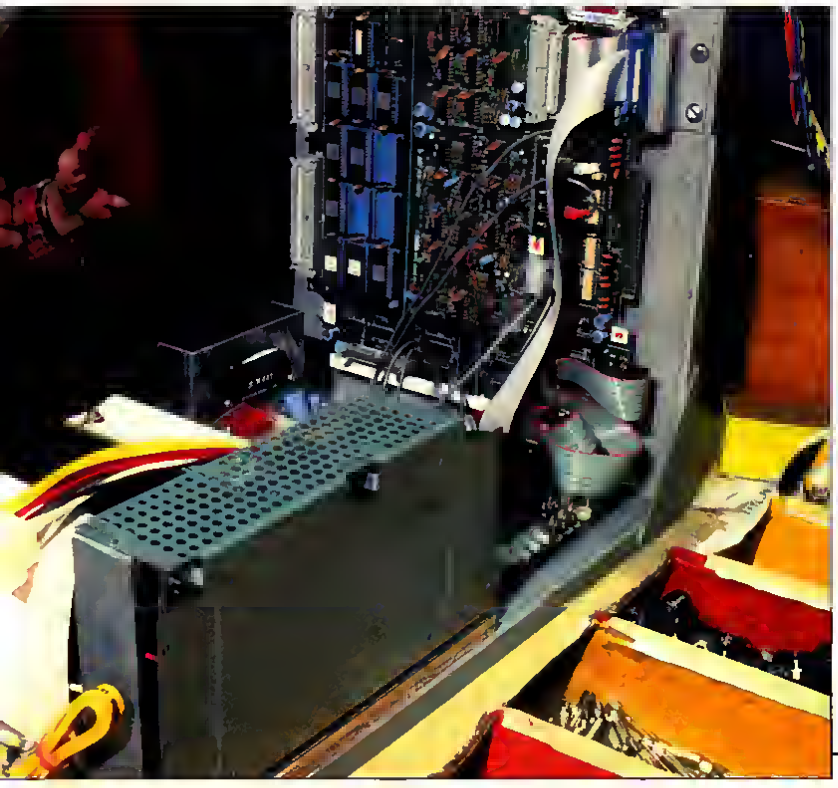
Today's game machines can hold from a quarter to a half million bits. They're plotted on 500-line high-resolution monitor screens. This means graphics can be amazingly detailed. In *Spy Hunter*, for instance, shading, windows and racing stripes can be shown on a car that's only one inch long on the screen.



2

THE HEART BEAT

This is the heart of the game machine—the power supply (RIGHT). It has one important function: to send a constant level of electricity to all parts of the game. It is crucial to maintain a steady voltage. Otherwise, programs could be lost or play could be interrupted. The power supply has to be strong enough to withstand almost continuous use, occasional abuse and, worst of all, sore losers.



3

QUARTER EATER

If the power supply is the heart of the game, then the coinbox (ABOVE) is the mouth. The coinbox does more than "eat" coins. It can be programmed to accept or reject coins of various sizes and weights. Once the coin is swallowed, it trips a microswitch that gets the game going.

The coinbox is wired to the game's central processing unit (CPU). It therefore can keep track of important information—like the number of games played and the average game play time.

This control and logic panel (LEFT) houses the game's brain. The unit consists of logic boards linked together by a flexible ribbon of cable. Its interface board enables the CPU to send and receive information from the joystick and other parts of the game machine.

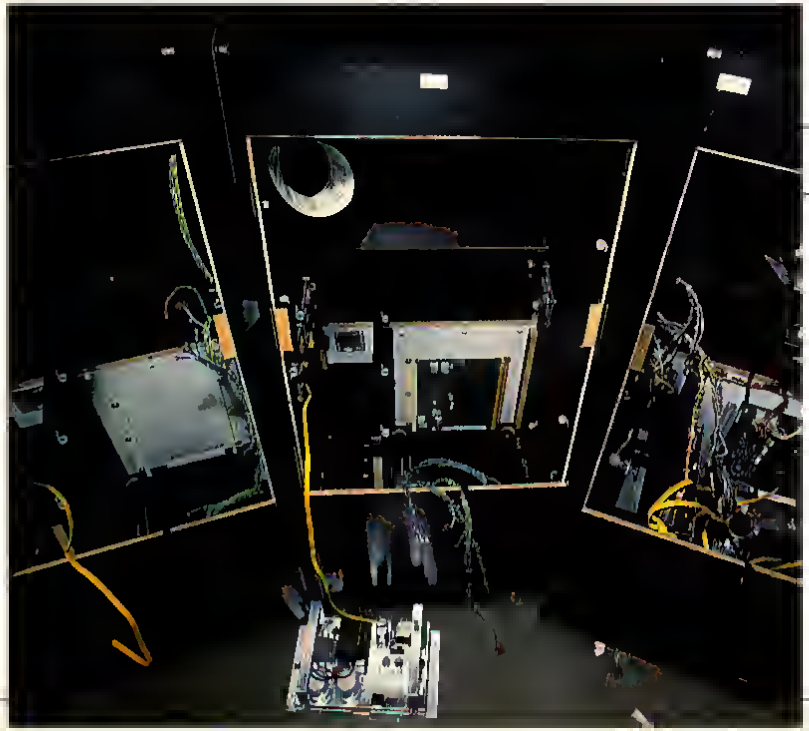
There's also a separate board with its own CPU for music and sound effects. *Spy Hunter*'s system features "stacked" sound. In older games, you'd only hear one sound at a time. Here, you can hear explosions, squealing tires and music all at once.

(Continued on next page)

4

TAKING CONTROL

The joystick, or control handle (RIGHT), in an arcade game has to be "player-proof" — in other words, virtually indestructible. It must also be sensitive enough to respond to a player's every move. When a player moves the controller, electronic switches are triggered. This translates player moves into action on the screen. *Spy Hunter* makes use of electronic rheostats (which act like dimmer switches) instead of simple on/off switches. As a result, screen movement is smoother and more realistic than in the past.



5

GETTING IT TOGETHER

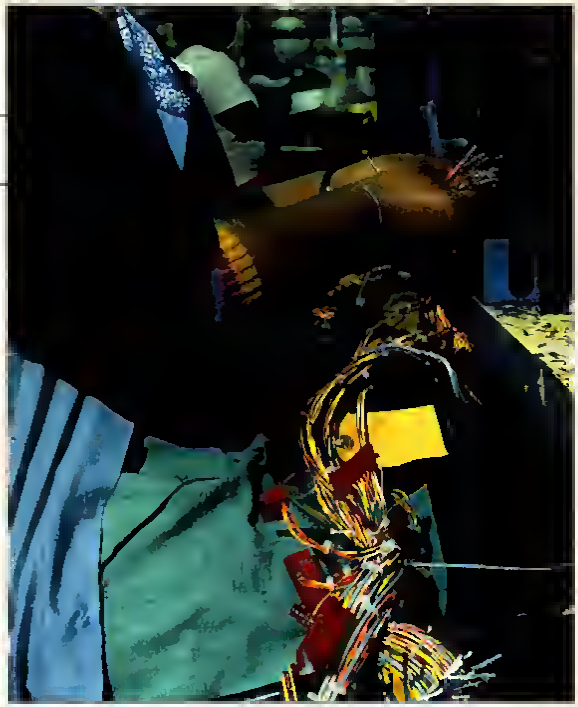
As the cabinets (LEFT) move down an assembly line—much like a Detroit auto assembly line—the separate parts are bolted down and soldered in. The power supply, coin box, control handle, logic panels and monitor screen all come together here.

6

WIRED FOR ACTION

Once the components are in place, it's time to get wired. Connecting all this complex gear requires a virtual spaghetti bowl of color-coded cables (RIGHT). Assembly line workers weave together this web so that each wire ends up in the proper location and can then be plugged into the right connection.

These wires carry the electronic output from the game's computer memory to create the images you see on screen. Unless the right connections are made, none of the futuristic vehicles, sinister villains or other James Bond-type tricks of *Spy Hunter* will ever appear.



7

PLAYING FOR KEEPS

Let the games begin! When everything is in place (LEFT), the cabinet is sealed and the game is plugged in. It's left running to make certain everything operates. Employees often get a chance to test play the game—for free, of course. When the assembly line at Bally is moving along, it can turn out about 1000 finished games a day.

That's a lot of hungry "mouths" to feed.

ROBERT CULICOVER is a freelance writer in New York City.

ENTER CONTEST #4

WIN A IIc!

Have you ever tried to teach anyone about computers and suddenly realized you didn't know the right name for parts of the machine? You may have sounded like this

"First you plug the thingamajig into the wall. Then you put this input whoozis into that little gizmo right next to the whatchamacallit."

What you needed was an interpreter—someone to explain that a serial port is not something you find in a box of Cheerios. And that there's no steering wheel on a disk drive.

Face it. Computer terms can be hard to understand or just plain silly. ENTER has decided to do something about it. We want you to

help us come up with a new name for computer parts. You might even win an Apple IIc!

HERE'S HOW OUR CONTEST WORKS

1. Make up five new computer words describing five different parts on a computer. Be sure to tell us what part of the computer you're naming.

For example, can you think of a better name for a keyboard? After all, it doesn't have any keys or boards on it. Maybe it should be called a "digi-digital interfacer" (It takes input from your fingers [digits] and stores the info in digital form).

The best entries will be judged by a team of language and computer experts selected by the ENTER staff. The winner and runner-ups will be chosen based on the originality of the names. The new names should be appropriate. They can be silly.

2. Send your entry to CONTEST # 4, ENTER Magazine, 1 Lincoln Plaza, New York, N.Y. 10023. All entries must be postmarked by September 10, 1984. The grand prize winner will be notified by Nov. 1. Good luck!

- THE ENTER "RE-NAME THE COMPUTER PART" CONTEST -

YOUR NAME: _____

ADDRESS: _____

_____

AGE: _____ **MALE:** **FEMALE:**

The Apple IIc is provided by the Apple Computer Company

1 Digi-digital interfacer. A keyboard

2 _____

3 _____

4 _____

5 _____

6 _____

BASIC TRAINING

PROGRAMS FOR YOUR COMPUTER

Adam, Apple, Atari, Commodore 64, IBM PC, TI 99/4A, Timex-Sinclair, TRS-80 Color Computer, VIC 20

"Four score and seven K RAM ago, our programmers brought forth upon this marketplace a new product, conceived in microchips, and dedicated to the algorithm that all disk drives should be created compatible."

September is back to school month, so we though we'd begin this BASIC Training with something everyone learns in school—the stirring opening words to Lincoln's famous Gettysburg Address. Of course, we mean Ralph Lincoln, from Gettysburg, California, in the heart of Silicon Valley. But then, what's a Lincoln or two between friends?

Enough with the educational-type stuff. The rest of BASIC Training is another great assortment of programs for all major home computers. In the following pages, you'll also find our recommendation for a new book on programming in BASIC, the winner of our programming Challenge #4, and a new BASIC Training Challenge.

NEXT MONTH: The beginning of an exciting 17-part series on the life of Ralph Lincoln, from his humble beginnings in a log cabin to his success as a video arcade owner.

—Richard Cheval, Technical Editor

MICRO MIND READER:

APPLE, ADAM, ATARI, IBM, TRS-80 COLOR COMPUTER, TIMEX SINCLAIR 1000,1500,2068

Computers can do anything, right? They can fly space shuttles, predict elections, even read minds.

Wait a minute. *Read minds?* Well, maybe computers can't read minds, but this program will convince your friends otherwise. When it runs, your trusty computer will display a 4X4 grid of numbers and ask you to pick four of them. And, before you start, it will "read your thoughts" and accurately predict the sum of the numbers you will pick.

How does your computer do it? Is there an ESP chip somewhere in there? Nope. The trick is in the programming. Your computer shows you a 4x4 grid, but it actually builds a 5x5 grid in array A (dimensioned in line **140**).

	0	1	2	3	4
0		9	6	12	5
1	2	11	8	14	7
2	11	20	17	23	16
3	15	24	21	27	20
4	7	16	13	19	12

To understand how this works, draw a 5x5 grid on a piece of paper. Number the columns **0** through **4**, and the rows **0** through **4**. The program fills in the invisible outer (**0**) row and column with eight random numbers (program lines **160** and **170**). It leaves the box with coordinates **0,0** empty. Then the program fills in the other boxes in the grid. It does this by adding the numbers from the zero column to the numbers from the zero row (in line **290**). For example, the number with the coordinates **1,1** is the sum of the numbers at **0,1** and **1,0**.

When you pick a number, the program erases all the other numbers in that row and column (lines **500-570**). So no two numbers you pick can be on the same row or column. This means that none of the original eight numbers is used more than once. The computer's prediction is just the sum of all eight numbers in the outer row and column (added up in line **190**).

So computers can't read minds after all. But computer magazines can! In fact, we predict that you will read this explanation again. After that, you will go to your computer and type in the program. A version for Apple and Adam computers follows, along with

(Program continues on next page)

(Program continued from previous page)

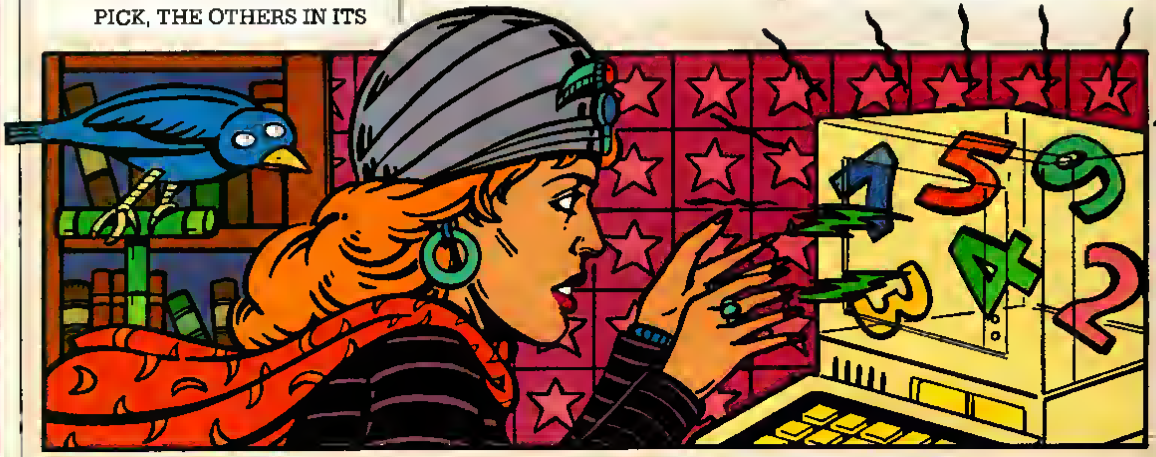
instructions for adapting it to other machines.

NOTE: The Apple version is written for a forty-column format.

APPLE, ADAM:

```
10  REM MIND READER
20  HOME
30  PRINT "I MAY NEVER HAVE TOLD YOU THIS, MASTER, BUT COMPUTERS CAN READ MINDS."
40  FOR F = 1 TO 3000
50  NEXT F
60  PRINT : PRINT "FOR EXAMPLE, I NOW SENSE THAT YOU DON'T BELIEVE ME."
70  PRINT "I WILL PROVE IT TO YOU. I WILL SHOW YOU A GRID AND ASK YOU TO PICK FOUR NUMBERS FROM IT."
80  PRINT "AND, BEFORE YOU START, I WILL PREDICT THE SUM OF THE NUMBERS YOU WILL PICK."
90  PRINT : PRINT "WITH EACH NUMBER YOU PICK, THE OTHERS IN ITS ROW AND COLUMN WILL BE ERASED."
100 PRINT "PLEASE DO NOT SELECT THE SAME NUMBER TWICE."
110 PRINT "PRESS RETURN TO CONTINUE"
120 INPUT A$
130 REM SET UP OUTER NUMBERS
140 DIM A(4,4)
150 FOR G = 1 TO 4
160 A(G,0) = INT (25 * RND (1))
170 A(0,G) = INT (50 * RND (1))
180 REM FIGURE SUM
190 S = S + A(G,0) + A(0,G)
200 NEXT G
210 HOME : HTAB 1: VTAB 12
220 PRINT "I PREDICT THAT THE SUM OF THE REMAINING NUMBERS WILL BE ";S
230 FOR F = 1 TO 3000
240 NEXT F
250 REM PRINT GRID
260 HOME : R = 0
270 FOR G = 1 TO 4
280 FOR H = 1 TO 4
290 A(G,H) = A(G,0) + A(0,H)
300 VTAB 3: HTAB 8 * G
310 PRINT "(";G;")"
320 HTAB 1: VTAB 5 * H
330 PRINT "(";H;")"
340 HTAB 8 * G: VTAB 5 * H
350 PRINT A(G,H);
360 NEXT H: NEXT G
370 HTAB 1: VTAB 1
380 PRINT "PREDICTION: ";S
390 REM PICK NUMBERS
400 HTAB 1: VTAB 21
410 PRINT "PICK A NUMBER AND TELL ME ITS HORIZONTAL AND VERTICAL COORDINATES: H,V"
420 PRINT "": HTAB 1: VTAB 23
430 INPUT A,B
440 IF A(A,B) = - 1 THEN 400
450 Y = A(A,B)
460 R = R + Y: REM R = SUM
470 VTAB 1: HTAB 20
480 PRINT "SUM: ";R
490 REM ERASE NUMBERS
500 FOR H = 1 TO 4
510 HTAB A * 8: VTAB H * 5
520 PRINT "****";
530 A(A,H) = - 1
540 HTAB H * 8: VTAB B * 5
550 PRINT "****";
560 A(H,B) = - 1
570 NEXT H
580 HTAB A * 8: VTAB B * 5
590 PRINT Y;
600 T = T + 1: REM T = PICKS
610 IF T < 4 THEN 400
```

(Program continues on next page)



(Program continued from previous page)

```
620 T = 0
630 HTAB 1: VTAB 21
640 PRINT "ADD UP THE
    REMAINING NUMBERS."
650 PRINT "DOES THE SUM
    MATCH MY PREDICTION?"
660 PRINT "WOULD YOU LIKE
    TO TRY AGAIN? SAME
    SQUARE?(S) DIFFERENT
    SQUARE?(D)",
670 INPUT A$
680 IF A$ = "D" THEN CLEAR
    : GOTO 130
690 GOTO 210
```

TRS/80 COLOR COMPUTER: Delete lines 310, 330, 350, 380, 420, 480, 520, 550, 590, 640, 650. Add or replace these lines.

```
20   CLS
85   FOR F=1 TO 3000:
     NEXT F:CLS
160  A(G,0)=RND(25)
170  A(0,G)=RND(50)
210  CLS
220  PRINT@224, "I PREDICT
     THE SUM OF THE
     REMAINING NUMBERS
     WILL BE     ";S
260  CLS:R=0
300  PRINT@5*G+36,"("G")",
320  PRINT@5+64*H,"("H")";
340  PRINT@64*H+5*G+5,
     USING"##", A(G,H)
370  PRINT@1,"PREDICTION=
          " S
400  PRINT@320,CHR$(31);
470  PRINT@20,"SUM:      " R
495  PRINT@320,CHR$(31)
510  PRINT@64*H+5*A+5,
     "***";
540  PRINT@64*B+5*H+5,
     "***";
580  PRINT@64*B+5*A+5,
     "*";RIGHT$ (STR$(Y),
     LEN(STR$(Y))-1);
630  PRINT@320,CHR$(31);
     "ADD UP THE
     REMAINING NUMBERS.
     DOES THE SUM MATCH
     MY PREDICTION?"
655  FOR F=1 TO 6000: NEXT
```

IBM PC and PCjr: Delete line 420. Add or replace these lines.

```
5    RANDOMIZE(4)
20   CLS
160  A(0,G)=INT(RND*25)+1
170  A(G,0)=INT(RND*50)+1
210  CLS:LOCATE 2,12
260  CLS:R=0
300  LOCATE 1,6,*G+3
320  LOCATE 3*H,3
340  LOCATE 3*H,6*G+3
370  LOCATE 14,1
400  LOCATE 16,1
470  LOCATE 14,19
510  LOCATE H*3,A*6+3
540  LOCATE B*3,H*6+3
580  LOCATE B*3,A*6+3
630  LOCATE 16,1
```

ATARI: Delete line 420. Add or replace these lines.

```
5    DIM A$(1)
20   GRAPHICS 0
210  GRAPHICS 0
     :POSITION 2,12
260  GRAPHICS 0:R=0
300  POSITION 5*G,1
320  POSITION 1,3*H
340  POSITION 5*G,3*H
370  POSITION 24,1
400  POSITION 1,16
470  POSITION 24,3
510  POSITION A*5,H*3
540  POSITION H*5,B*3
580  POSITION A*5,B*3
630  POSITION 1,16
680  IF A$="D" THEN CLR:
     GOTO 130
```

TIMEX SINCLAIR 100,1500,2068:

```
10   RAND 0
20   CLS
30   PRINT "I MAY NEVER
     HAVE TOLD YOU
     THIS, MASTER, BUT
     COMPUTERS CAN
     READ MINDS."
40   FOR F=1 TO 600
45   NEXT F
50   PRINT
55   PRINT "FOR EXAMPLE, I
     NOW SENSE THAT YOU
     DON'T BELIEVE ME."
60   PRINT "I WILL PROVE IT.
     I WILL SHOW YOU A
     GRID AND ASK YOU TO
     PICK FOUR NUMBERS."
70   PRINT "AND BEFORE
     YOU START, I WILL
     PREDICT THE SUM OF
     THE NUMBERS YOU
     WILL PICK."
75   FOR F=1 TO 600
80   NEXT F
90   CLS
95   PRINT "EVERY TIME YOU
     PICK A NUMBER, THE
     OTHERS IN ITS ROW AND
     COLUMN WILL BE
     ERASED."
100  PRINT "PLEASE DO NOT
     SELECT THE SAME
     NUMBER TWICE."
110  PRINT "PRESS RETURN
     TO CONTINUE."
120  INPUT A$
130  LET S = 0
140  DIM A(5,5)
150  FOR G=2 TO 5
160  LET A(G,1)=
     INT(RND*25)+1
170  LET A(1,G)=
     INT(RND*50)+1
180  REM FIGURE SUM
190  LET S=S+A(G,1)+
     A(1,G)
200  NEXT G
210  CLS
220  PRINT AT 10,10;"I
     PREDICT THE SUM OF
     THE REMAINING
```

(Program continues on next page)

(Program continued from previous page)

```
      NUMBERS WILL BE  ";S
230   FOR F=1 TO 300
240   NEXT F
250   REM PRINT GRID
260   CLS
265   LET R=0
266   LET T=0
270   FOR G=2 TO 5
280   FOR H=2 TO 5
290   LET A(G,H)=A(G,1)
      +A(1,H)
310   PRINT AT 1,5*H;
      "(";H-1;")"
320   PRINT AT 3*G,1;
      "(";G-1;")"
350   PRINT AT 3*G,5*H;A(G,H)
360   NEXT H
365   NEXT G
370   PRINT AT 17,1;
      "PREDICTION    ";S
400   PRINT AT 19,1;"PICK
      A NUMBER. TELL
      ME ITS HORIZONTAL
      COORDINATE."
410   INPUT A
420   PRINT "AND
      ITS VERTICAL
      COORDINATE."
430   INPUT B
435   LET A=A+1
436   LET B=B+1
440   IF A(A,B)=-1 THEN
      GOTO 400
450   LET Y=A(A,B)
460   LET R=R+Y
470   PRINT AT 17,14;
      "SUM     ";R
490   REM ERASE NUMBERS
500   FOR H=2 TO 5
510   PRINT AT B*3,H*5;"****";
530   LET A(A,H)=-1
540   PRINT AT H*3,A*5,"****";
560   LET A(H,B)=-1
570   NEXT H
580   PRINT AT B*3,A*5;Y
600   LET T=T+1
610   IF T<4 THEN GOTO 400
620   LET T=0
630   PRINT AT 19,1,"ADD UP
      THE REMAINING
      NUMBERS. DOES THE
      SUM MATCH MY
      PREDICTION?
640   FOR F=1 TO 300
650   NEXT F
655   CLS
660   PRINT "WOULD YOU
      LIKE TO TRY AGAIN?
      WITH THE SAME
      SQUARE? (S) A
      DIFFERENT SQUARE? (D)"
670   INPUT A$
680   IF A$="S" THEN
      GOTO 210
690   CLEAR
700   GOTO 130
```

—*David Lewis*

FOOD LINE: COMMODORE 64, VIC 20, TI 99 4/A

After hours of playing *Pac-Man*, did you ever once stop to consider where all that food came from? Noooo! All you ever cared about was eating those dots and getting away from those monsters.

Now, with the game *Food Line* you can get a taste of what it's like to try and feed a lot of hungry people. In this game, you are a waiter or waitress. Your job is to keep five different types of food on the table while invisible customers gulp them down. For each dish you serve, you get a tip. If any of the foods run out, you're fired!

You move from food to food by pressing the **A** or **L** keys (lines **180** through **230** in the Commodore version). To add to the food you're under, press the space bar and you'll see the dishes stack up. A record of the amounts of food is kept in array **D**.

Each of the foods is consumed at a slightly different rate, set randomly in line **140**. This eating rate is subtracted from the amount of each food in line **360**. Variable **H** is a hunger factor that makes the food disappear faster.

Lines **290** through **340** print the stacks. Line **310** rounds down the amount of food in each stack to the nearest whole number. Line **320** POKEs a food symbol at the top of the stack. Line **330** POKEs a blank space above it (in case the stack has gotten smaller).

Once you get the hang of it, you'll be able to rack up quite a few tips before you're fired. But watch out for those customers. They're never satisfied!

NOTE: O means press the up/down CRSR. q means SHIFT – up/down CRSR. R means CTRL – 9. r means CTRL – 0.

COMMOOORE 64:

```
10    REM FOOD LINE
20    PRINT CHR$(147)
30    POKE 53281,0
40    DIM S(5):REM SYMBOLS
50    DIM D(5).REM FOOD
60    DIM R(5).REM RATES
70    T=0:REM TIPS
80    PRINT TAB(12)"R FOOD
      LINE r"
85    C=9:REM COLORS
90    FOR I=55980 TO 56008
      STEP 7
95    FOR J=I TO I-480
      STEP -40
100   POKE J,C
105   NEXT:C=C-2:NEXT
110   PRINT "OOOOOOOOOO
      OOOOO"
115   PRINT TAB(1)"R STEAK
      JUICE SALAD DESSERT
      MILK r"
120   PRINT "O":PRINT TAB
      (15)"TIPS: q"
125   FOR I=1 TO 5
130   READ S(I)
140   R(I)=RND(1)*.001
150   D(I)=.8:NEXT
160   C=1802.D=1802
170   GET A$
180   POKE D,32:REM CURSOR
190   IF A$="A" THEN
      C=C-7
200   IF A$="L" THEN
      C=C+7
210   IF C>1816 THEN C=1816
220   IF C<1788 THEN C=1788
230   POKE C,86:D=C
235   REM ADD TO STACKS
240   IF A$<>CHR$(32)
      THEN 295
250   J=(C-1781)/7
260   D(J)=D(J)+1
270   IF D(J)>12 THEN D(J)=12
280   T=T+1
290   PRINT TAB(20) T;"    q"
300   FOR I=1 TO 5
310   K=(7*I)-INT(D(I))*40
320   POKE 1701+K,S(I)
330   POKE 1701+K-40,32
340   NEXT I
345   REM EAT FOOD
350   FOR I=1 TO 5
360   D(I)=D(I)-R(I)-H
370   IF D(I)<0 THEN POKE
      1701+(7*I),32:GOTO 500
380   NEXT
390   H=H+.0006:GOTO 170
500   PRINT TAB(12)
      "qqqqqqqYOU'RE FIRED"
510   GOTO 510
1000  DATA 121,102,88,87,114
```

VIC 20: Delete lines 100,105. Add or replace these lines

```
30    POKE 36879,24
35    FOR I=38796 TO 38818
36    POKE I,0:NEXT
80    PRINT TAB(5) "R FOOD
      LINE r"
90    FOR I=38797 TO 38815
      STEP 6
91    FOR J=1 TO I-264
      STEP-22
92    POKE J,0:NEXT:NEXT
110   PRINT "OOOOOOOOO
      OOOO"
115   PRINT "RSTEAK JUICE
      SALAD CAKEr"
120   PRINT "O":PRINT TAB(5)
      "TIPS:q"
160   C=8077:D=8077
190   IF A$="A" THEN
      C=C-6
200   IF A$="L" THEN
      C=C+6
210   IF C > 8095 THEN
      C=8095
220   IF C < 8077 THEN
      C=8077
250   J=(C-8071)/6
290   PRINT TAB(9)T; "q"
300   FOR I=1TO4
310   K=(6*I)-INT(D(I))*22
320   POKE 8005+K,S(I)
330   POKE 8005+K-22,32
350   FOR I=1TO4
370   IF D(I) > 0THEN POKE
      8005+(6*I),32:GOTO 500
500   PRINT TAB (5) "qqqqqqq
      YOU'RE FIRED"
```

(Program continues on next page)

BASIC TRAINING RECOMMENDS:

Out of all the hundreds of books on programming in BASIC, one of the most popular has been *It's BASIC: The ABCs of Computer Programming* by Shelley Lipson. Now we're happy to see a new book by the same author that takes up where *It's BASIC* left off. It's called *MORE BASIC: A Guide to Intermediate-Level BASIC Programming*.

Like the first book, *MORE BASIC* is written in a clear, easy to understand style that a lot of user's manuals don't have. We especially liked the fact that each chapter concentrates on just one programming concept or BASIC statement. There are also lots of practical examples of how each statement should and should *not* be used.

If you didn't read the first book, the first chapter is a review of beginning concepts and statements like PRINT, LET, GOTO, INPUT and IF/THEN. The rest of the book goes on to cover more advanced use of PRINT, FOR/NEXT loops, READ and DATA statements, arrays and DIM statements, the INT and RND numeric functions, and subroutines.

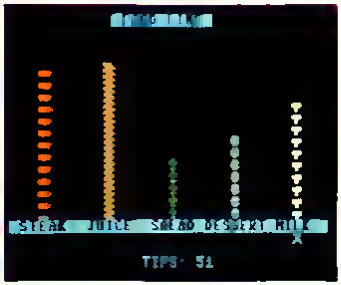
MORE BASIC is written to be used with any home computer. It can't replace your owner's manual, but we think it will make programming much easier to learn. *MORE BASIC* is published by Holt, Rinehart and Winston. It is only out in hardcover, costs $8.70 and is available in most bookstores.

BASIC TRAINING

(Program continued from previous page)

TI 99/4A VERSION:

```
10   REM FOOD LINE
20   RANDOMIZE
30   CALL CLEAR
40   CALL CHAR(128,
     "0000000000FFFFFF")
50   CALL CHAR(129,
     "AA55AA55AA55AA55")
60   CALL CHAR(130,
     "183C7E7E3C181818")
70   CALL CHAR(131,
     "0042427E7E7E7E7E")
80   CALL CHAR(132,
     "000000FFFF3C3C3C")
90   CALL SCREEN(5)
100  DIM D(5)
110  DIM R(5)
120  T=0
130  PRINT TAB(12);"FOOD
     LINE"
140  FOR P=1 TO 18
150  PRINT
160  NEXT P
170  PRINT "STEAK
     JUICE SALAD
     CAKE MILK"
180  PRINT
190  FOR I=1 TO 5
```




```
200  R(I)=RND*.001
210  D(I)=.9
220  NEXT I
230  Q=17
240  W=17
250  CALL KEY(Q,A,S)
260  REM CURSOR
270  CALL HCHAR (23,W,32,1)
280  IF A<>65 THEN 300
290  Q=Q-5
300  IF A<>76 THEN 320
310  Q=Q+6
320  IF Q<=27 THEN 340
330  Q=27
340  IF Q>=7 THEN 360
350  Q=7
360  CALL HCHAR(23,Q,88,1)
370  W=Q
380  IF A<>32 THEN 450
390  REM ADD TO STACKS
400  J=(Q-2)/5
410  D(J)=D(J)+1
420  IF D(J)<12 THEN 440
430  D(J)=12
440  T=T+1
450  REM PRINT STACKS
460  FOR I=1 TO 5
470  J=I*5+2
480  K=21-INT(D(I))
490  CALL HCHAR(K,J,127+I)
500  CALL HCHAR(K-1,J,32)
510  NEXT I
520  REM EAT FOOD
530  FOR I=1 TO 5
540  D(I)=D(I)-R(I)-H
550  V=D(I)
560  IF V>0 THEN 590
570  CALL HCHAR(21,I*
     5+2,32)
580  GOTO 620
590  NEXT I
600  H=H+.002
610  GOTO 250
620  PRINT TAB(5);
     "YOU'RE FIRED"
630  PRINT "YOU EARNED
     $";T;" IN TIPS"
640  GOTO 640
```

—Michael Allen

CHALLENGE #7: SEASON'S GREETINGS?

It's the end of summer, and you're more interested in squeezing in one more trip to the beach than thinking about mistletoe, Santa Claus, Christmas and Chanukah. However, this is the time of year when magazines (including ENTER) are preparing their December issues. So beat the heat and start thinking about Season's Greetings—our programming Challenge #7.

We want you to create a program with a holiday theme. It can play Auld Lang Syne or Jingle Bells. It can be a party game to play New Year's Eve, or a program that helps you organize gift-shopping. Or what about a program that predicts events in 1985? If you win, your program will appear in our December issue and you will receive $50 and an ENTER T-shirt.

Send your program to CHALLENGE #7, ENTER Magazine, CTW, 1 Lincoln Plaza, N.Y., N.Y. 10023. All entries must be postmarked no later than September 15. We read every program that is sent in, but because we get hundreds of entries every month, we cannot reply to each of you.

Please keep programs under 75 statements. Remember to enclose a note telling us your name, age, T-shirt size, the computer the program was written for, and a brief description of what it does.

And remember, if you have any other programs you think belong in ENTER, send them in to BASIC Training, at the address above. If we like your program, we'll print it and send you $50 and a T-shirt.

WINNER OF CHALLENGE #4: BATTING PRACTICE: TI 99/4A

Challenge #4 asked you to write a program with a baseball theme, and we think 12-year-old Joel Fox of Carrol, Iowa, scored a home run with his Batting Practice program. It uses the programmer-defined characters of the TI 99/4A to display a pitcher, batter and three infielders. When the ball is pitched, you press the "H" key to swing the bat. If you time your swing correctly, you hit a home run. If you're too early or too late, you get a strike.

There are lots of additions you can make to "Batting Practice." For instance, you could make it keep track of hits, strikes and outs. Maybe you want to write a routine that lets you hit the ball in different directions. Keep at it, and Batting Practice can become an entire video baseball game.

Way to go, Joel! And, all you other Challenge-takers out there, keep on slugging!

```
5   REM BATTING
    PRACTICE
10  FOR A=1 TO 16
20  CALL COLOR (A,16,1)
30  NEXT A
40  CALL CHAR (129,
    "183C18FF99BD2466")
50  CALL CHAR (130,
    "193D191F183C2466")
60  CALL CHAR (131,
    "183D191F183C2466")
70  CALL CHAR (132,
    "183C191F183C2466")
80  CALL CHAR (133,
    "183C181F183C2466")
90  CALL CHAR (136,
    "707C303E3F70586C")
100 CALL CHAR (148,
    "00000000F03C0C")
110 CALL CHAR (149,
    "00000000F0")
120 CALL CHAR (150,
    "00000F3CF0")
130 CALL CHAR (151,
    "01030E38E0")
140 CALL CHAR (153,
    "0000000000060F06")
150 CALL CLEAR
160 CALL SCREEN (2)
170 CALL COLOR (13,9,1)
180 CALL COLOR (14,6,1)
190 CALL COLOR (15,12,1)
200 CALL COLOR (16,16,1)
210 REM PLOT FIELDER
```


```
220 CALL HCHAR (12,3,129)
230 CALL HCHAR (1,16,129)
240 CALL HCHAR (12,30,129)
250 CALL HCHAR (12,16,129)
260 REM PLOT THE BATTER
270 CALL HCHAR (23,15,136)
280 REM MAIN ROUTINE
290 FOR A=1 TO 250
300 NEXT A
310 FOR A=130 TO 133
320 CALL HCHAR (12,16,A)
330 FOR Z=1 TO 25
340 NEXT Z
350 NEXT A
355 REM THE PITCH
360 FOR A=13 TO 24
370 CALL HCHAR (A,16,153)
380 CALL HCHAR (12,16,129)
385 REM CHECK FOR SWING
390 CALL KEY (0,K,S)
400 IF K=72 THEN 480
410 IF K= 104 THEN 480
420 CALL HCHAR (A,16,32)
430 NEXT A
440 M$="STRIKE!!!"
450 GOSUB 700
460 GOTO 150
470 REM BATTING
480 FOR R=148 TO 151
490 CALL HCHAR (23,16,R)
500 NEXT R
505 REM A STRIKE?
510 IF A=22 THEN 540
520 IF A>23 THEN 440
530 GOTO 440
535 REM A HIT
540 CALL SOUND(-150,-6,1)
550 CALL HCHAR (22,16,32)
560 FOR AR=A-1 TO 1
    STEP-1
570 REM A HOMER
580 CALL HCHAR(AR, 17,153)
590 NEXT AR
600 M$="HOME RUN"
610 GOSUB 700
620 GOTO 150
700 REM PRINT RESULTS
710 FOR A=1 TO LEN(M$)
720 CODE=ASC(SEG$
    (M$,A,1))
730 CALL HCHAR (19,11+A,
    CODE)
740 NEXT A
750 FOR D=1 TO 250
760 NEXT D
770 RETURN
```

—Joel Fox

CORRECTION:

The Timex-Sinclair and Atari adaptations of the "Codes Master" program in our June issue (page 51) contained errors. On the Atari version, this line must be added:

```
7 DIM R$(1)
```

In the Timex adaptation, line 270 should have read:

```
270 LET A = CODE T$
```

(Continued from page 13)

points. Mess up this maneuver and you go off the road. If you would rather *not* hit the cars or obstacles in front, hit the action button and your car jumps into the air.

WRAP-UP

PHIL: As with most Intellivision games, the disc controller is unsatisfactory for this game. But you do get a lot of fast action and good strategic depth from the 10 types of cars on the road. It's fun to go 220 mph when you know you can leave the ground at any time!

BERNIE: The bumping is wonderful. The jumping is a neat addition, because it goes beyond reality. Here, you drive a dream car. It's a game that plays very well compared to the coin-op. Still, I wanted more variation in track design, and the car graphics are too abstract and blocky.

BRUCE LEE

(Datasoft, disk or cassette for Commodore 64, $34.95, also for Apple II, Atari computers, IBM PC and PCjr)

We approached this game hesitantly. How could any game about martial arts really translate

into fun on the computer screen?

We discovered that the aim is not to damage your opponents so much as it is to defend yourself while finding a way through a multi-level fortress. After just a single game, we knew that *Bruce Lee* would receive a high rating. If you play against the computer, you will have two opponents: a stick-swinging ninja and Yamo, a rotund sumo-wrestler. Your character must hold these two at bay with kicks and chops, but can also duck, jump up, leap sideways, and climb vines. It's a constant choice of fight or flight. But the game is not as violent as it sounds. The worst you can do is knock them out.

WRAP-UP

BERNIE: *Bruce Lee* is just good plain fun. It has non-stop action and plenty of strategy. Plus it gives you a real sense of controlling an individual character on the screen.

PHIL: It's great because you can play against the computer, against another player, or as two players against the computer. I think the two-player games are the most fun.

ZAXXON

(Synapse, disk or cassette for Commodore 64, $40)

We know this is an old game that you are undoubtedly familiar with—the ultimate shoot 'em up space ship game. But this is the first home release of *Zaxxon* that is actually *better* than what you get for a quarter in the arcades. The graphics are marvelously detailed and the illusion of three dimensions is very strong. Anyone with a Commodore 64 who likes this type of game will be zapping and dodging *Zaxxon* for years to come.

BOULDER DASH

(First Star Software, disk or cassette for Atari computers, $29.95, $39.95 cartridge. Also for Commodore 64 and IBM PCjr)

In the spirit of Atari's *Dig Dug*, *Boulder Dash* is a make-your-own-path maze game. Each round

of play features a gameboard that is several screens wide and tall. You have to scroll around and are unable to see everything at once. On each level, boulders are suspended by dirt. You carve paths beneath the boulders, and they come crashing down. You have to move fast!

You spend your energy collecting star crystals. When you have collected enough, you enter the next round. But you must find and enter the door to that round before the timer runs out. You'll want to move with caution to avoid the crushing boulders, but you'll also have to race the clock.

WRAP-UP

PHIL: Boulder Dash may sound like *Dig Dug*, but it has more variety of action. There is little about this game I would change if given the chance.

BERNIE: I agree—it's challenging. But I didn't like the fact that you can end up in a trapped position. Then you can't do anything but wait for the timer to expire.

FEEDBACK

(Continued from page 5)

A QUESTION OF AGE

I really enjoy your magazine, but I am a little confused. On your subscription form you say ENTER is for ages 10-16. May I continue my subscription after the age of 16?

—Tom Rose
Perrysburg, OH

Dear Tom:

Absolutely! We hope you do. ENTER seems to attract readers of all ages—including adults. We even have letters from subscribers complaining they can't read their issue when it arrives in the mail because Mom or Dad gets to it first. To those families we say time to think about getting two subscriptions!

—Ed.

READ ME A STORY

In the April issue of your magazine, there was an article called "Talking Book" by Freff. I was fascinated by the new technology that Ray Kurzweil has developed. I would like to be able to contact Mr. Kurzweil to find out some more information on this new product. Could you tell me where I can write to him? The applications of this KRM are unlimited.

—Michele E. Tuvell
Cirus Heights, CA

Dear Michele

To learn more about the Kurzweil Reading Machine (like the one that musician Stevie Wonder uses,) write to Liz Ireland at KURZWEIL MUSIC, 411 Waverly Oaks Road, Waltham, MA 02154. She'll be glad to send you more information.

—Ed

CLIFF HANG-UP

In your March '84 issue, you put the first dozen moves for *Cliff Hanger* ("Game Plan"). You put FEET-FEET-HANDS-LEFT for the first four moves. I saw my cousin play, and the first four moves were FEET-FEET-HANDS-FORWARD. Who is right?

—Jean Tanaka
Waipahu, HI

Dear Jean

Your cousin is. Thanks to you and other readers for pointing out our mistake.

—Ed.

ACCESS TO RANDOM ACCESS

How can I get more information on writing an article for "Random Access"?

—Ben Chappell
Bluffton, OH

Dear Ben

Does this mean you have a great idea for a column? If so, write us a short letter telling us what you'd like to write about. Also include your phone number and address, and we'll get back to you. Write "Random Access" Editor, ENTER Magazine, 1 Lincoln Plaza, New York, NY 10023. And that goes for any other readers interested in writing for ENTER.

—Ed.

SMART SHOPPERS

I would like to know if you could put an article in your magazine that would help people who are looking for computers and would tell them what the best buy is. Also what the best and worse computers are.

—Robby Chamberlin
Woodland, CA

Dear Robby

In the premiere issue of ENTER (October '83) we ran an article called "Buying the Right Computer." Well, it looks like a computer round-up is going to become an annual event in ENTER. Look for the updated computer buyers' guide to appear in an upcoming issue of ENTER. We won't tell which computer to buy, but we can help you make an educated decision when you take the big step.

—Ed

WRITE TO US!

ENTER wants to hear from you. If you're a subscriber to either The Source or CompuServe, you can communicate with us through your computer. Our Source number is BBI113, our CompuServe ID is 72456,1776. If you're simply writing through the U.S. Mail, contact us at ENTER, 1 Lincoln Plaza, New York, NY 10023.

PENCIL CRUNCHERS

BEAT THE COMPUTER

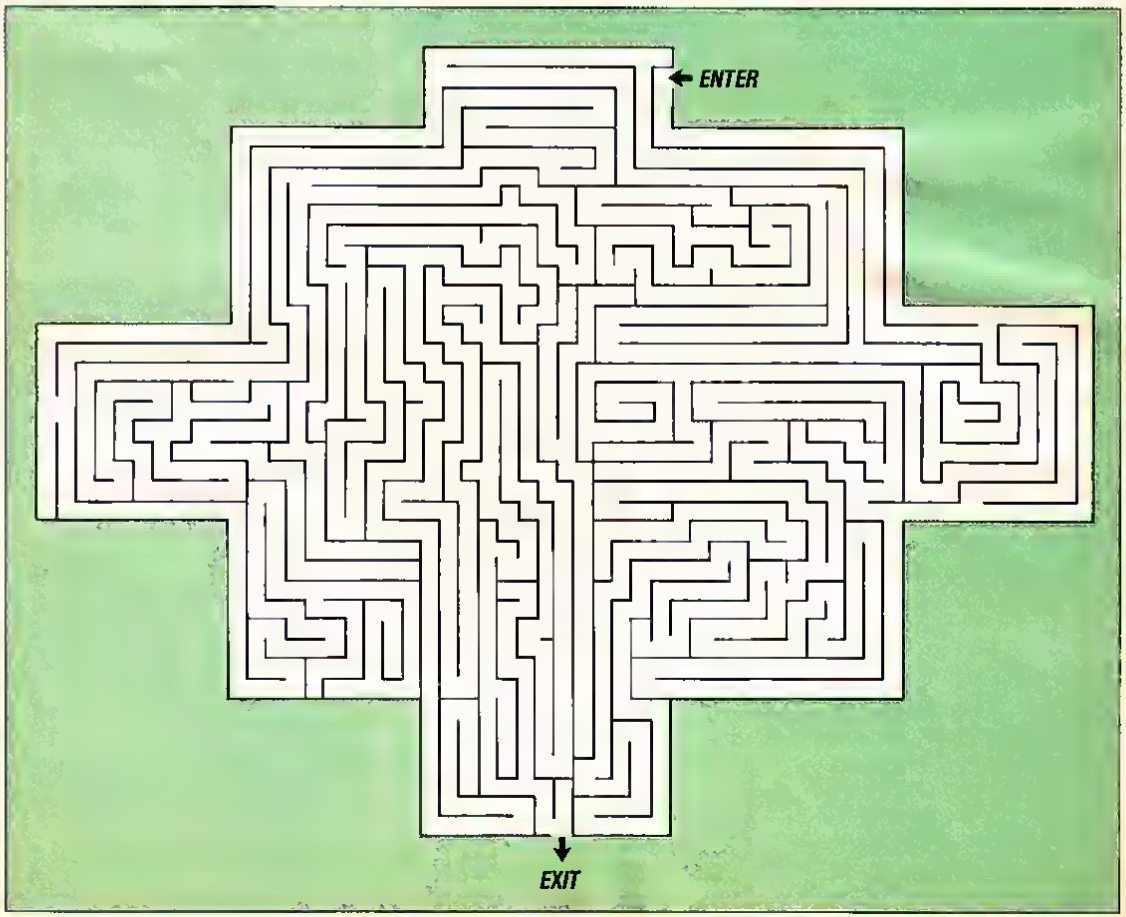
BY BELA SELENDY

This maze was created by ENTER's master maze-maker, Bela Selendy. Bela, 16, is a member of our Youth Advisor board. Using an Apple II+, he creates computer-generated mazes that boggle even the most avid maze-doers.

Here's yet another of his creations to baffle you with its dead ends, squiggles and turns. Give it a try, but don't lose your cool. Though it's hard to believe, there really is one path that leads from enter to exit.

How long will it take you to find it? Happy travelling!

(Answer on page 64)



LINE DRAWING © NINA WALLACE FROM COMPUTER-GENERATED MAZE © BELA SELENDY

PENCIL CRUNCHERS

COMPU-HUNT

BY REBECCA HERMAN

Hidden in the box below are the names of computers and manufacturers. To find them, you'll need to look across, up and down, diagonally, and even backwards. We've circled one to get you started.

After you've found all 27 names, go back and read the uncircled letters from left to right. You'll find out what the world's simplest computer is. *(Answers on page 64.)*

ADAM
APPLE
ATARI
CDP-PC
COLECOVISION
COMMODORE
COMPAQ
CROMEMCO
DIGITAL
EPSON
FRANKLIN ACE
HEATH/ZENITH
HEWLETT-PACKARD
HITACHI
HYPERION
IBM
LISA
MACINTOSH
MATTEL AQUARIUS
OSBORNE
PET
SUPERBRAIN II
SUPERPET
TEXAS INSTRUMENTS
TIMEX/SINCLAIR
VICTOR
XEROX

S	U	I	R	A	U	Q	A	L	E	T	T	A	M	T	H
T	E	P	R	E	P	U	S	N	I	H	C	A	T	I	H
N	E	H	Y	P	E	R	I	O	N	S	R	I	M	I	E
E	A	D	A	M	M	A	C	I	N	T	O	S	H	N	W
M	P	L	P	E	I	S	T	S	V	D	M	F	T	I	L
U	C	O	P	M	B	A	S	I	L	I	E	R	I	A	E
R	A	P	L	U	M	T	C	V	I	G	M	A	N	R	T
T	N	T	E	G	D	T	O	O	E	I	C	N	E	B	T
S	V	C	A	I	O	C	M	C	E	T	O	K	Z	R	P
N	S	D	O	R	F	A	M	E	L	A	L	L	H	E	A
I	A	P	R	E	I	Y	O	L	O	L	U	I	T	P	C
S	R	P	H	A	N	D	D	O	S	W	E	N	A	U	K
A	H	C	Q	A	P	M	O	C	E	P	N	A	E	S	A
X	E	R	O	X	Y	O	R	U	S	C	O	C	H	U	R
E	N	R	O	B	S	O	E	O	N	T	O	E	N	T	D
T	I	M	E	X	S	I	N	C	L	A	I	R	H	E	M

NEXT

COMING IN OUR NEXT ISSUE:

LIFE ON-LINE: People across the country are communicating by computer—telling tales, playing games and meeting a world full of new friends. ENTER takes you inside the nationwide network that's tied together by modem and telephone lines. And we show how you can come on-line, too.

COMPUTERS GO TO COLLEGE: What happens when everyone at a college *must* own and use a computer? Two students tell about their first year as part of an on-campus experiment.

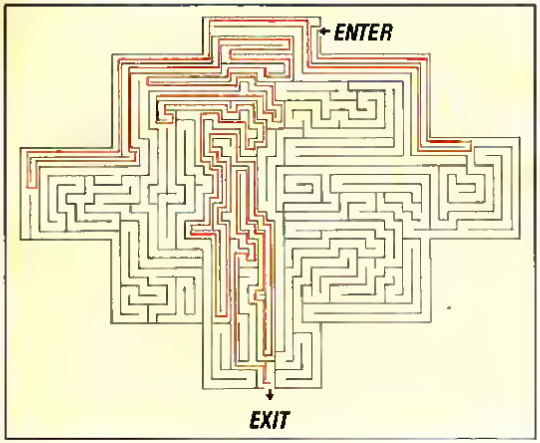
MARTINA: PROGRAMMED TO WIN: Tennis superstar Martina Navritalova is using incredible athletic skill—and computers—to take over center court. ENTER interviews Martina, and tells how computers have made a difference.

S.A.T. REVIEWS: When you're being tested on everything you've ever learned, it's good to get help. ENTER rates software that helps gets you ready for the SATs.

SPECIAL PHOTO CREDIT: The computer-generated photograph on page 27, "Road to Point Reyes," is one of the most complex computer graphics ever created. It was done by a team of Lucasfilm designers and programmers. Rob Cook designed the picture and did the texturing and shading. Loren Carpenter used fractals for the mountains, rock and lake. Tom Porter wrote the compositing software. Bill Reeves wrote the modelling software. David Salesin put ripples in the puddles, and Alvy Ray Smith rendered the plants.

ANSWERS

BEAT THE COMPUTER *(page 62)*



COMPU-HUNT *(page 63)*

S	U	I	R	A	U	Q	A	L	E	T	T	A	M	T	H
T	E	P	R	E	P	U	S	N	I	H	C	A	T	I	H
N	E	H	Y	P	E	R	I	O	N	S	R	I	M	I	E
E	A	D	A	M	M	A	C	I	N	T	O	S	H	N	W
M	P	L	P	E	I	S	T	S	V	D	M	F	T	I	L
U	C	O	P	M	B	A	S	I	L	I	E	R	I	A	E
R	A	P	L	U	M	T	C	V	I	G	M	A	N	R	T
T	N	T	E	G	D	T	O	O	E	I	C	N	E	B	T
S	V	C	A	I	O	C	M	C	E	T	O	K	Z	R	P
N	S	D	O	R	F	A	M	E	L	A	L	L	H	E	A
I	A	P	R	E	I	Y	O	L	O	L	U	I	T	P	C
S	R	P	H	A	N	D	D	O	S	W	E	N	A	U	K
A	H	C	Q	A	P	M	O	C	E	P	N	A	E	S	A
X	E	R	O	X	Y	O	R	U	S	C	O	C	H	U	R
E	N	R	O	B	S	O	E	O	N	T	O	E	N	T	D
T	I	M	E	X	S	I	N	C	L	A	I	R	H	E	M

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First, there's *Gremlins*, based on the characters from the original film presented by Steven Spielberg.

Then there's *Crystal Castles*™ where Bentley Bear™ journeys through all sorts of tantalizingly difficult paths and ramps in his endless quest for gems.

In *Donkey Kong Jr.* by Nintendo, Junior tries to rescue his father against immense odds. And speaking of Donkey Kong, there's also *Mario Brothers*[2] by Nintendo. This time, Mario and his brother Luigi battle creatures on four levels of floors, encountering all sorts of treacherous enemies.

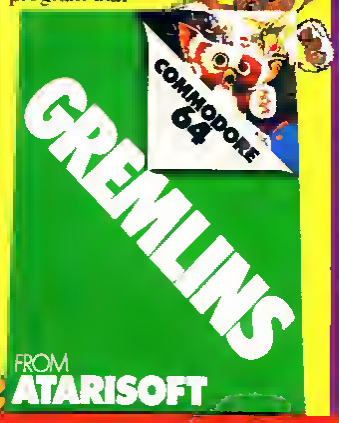
In *Track And Field*[3] you can compete by yourself or head-to-head with another player. But each player must beat qualifying times, heights and distances before they can compete in each of the gruelling six events.

Typo Attack is the much-acclaimed, fun-filled program that allows you to enjoy developing your typing skills at any level.

And still playing to the delight of audiences everywhere are *Pac-Man*;[4] *Ms. Pac-Man*;[4] *Jungle Hunt*;[5] *Battlezone*;[6] *Donkey Kong*;[2] by Nintendo; *Centipede*[7] and *Pole Position*.[8]

So, if you've been searching for ways to entertain your Commodore, Apple or IBM, treat it to one of the best shows in town, one of the hits from ATARISOFT.

And don't forget the popcorn.



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*Titles available on IBM PC jr are Ms. Pac-Man, Centipede, Donkey Kong, Moon Patrol[9] and Typo Attack. Available on the VIC 20 is Typo Attack.

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Thank you!